June, 1954

THE CHEMIST

VOLUME XXXI NUMBER 6

Dr. Lincoln T. Work, retiring AIC President, presenting Honorary AIC Membership to Dr. William J. Sparks, 1954 Gold Medalist.

(See page 217)

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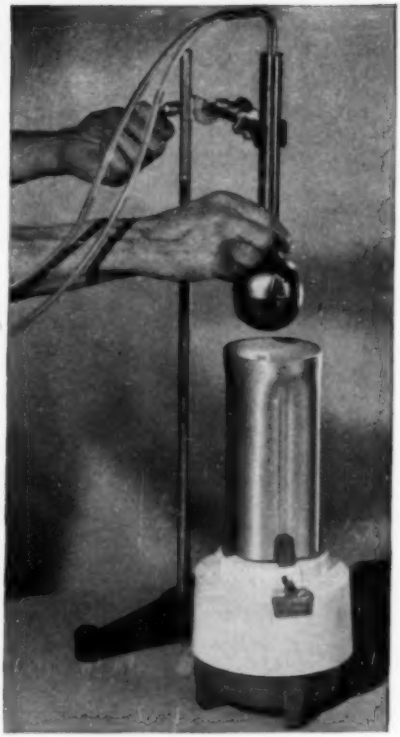

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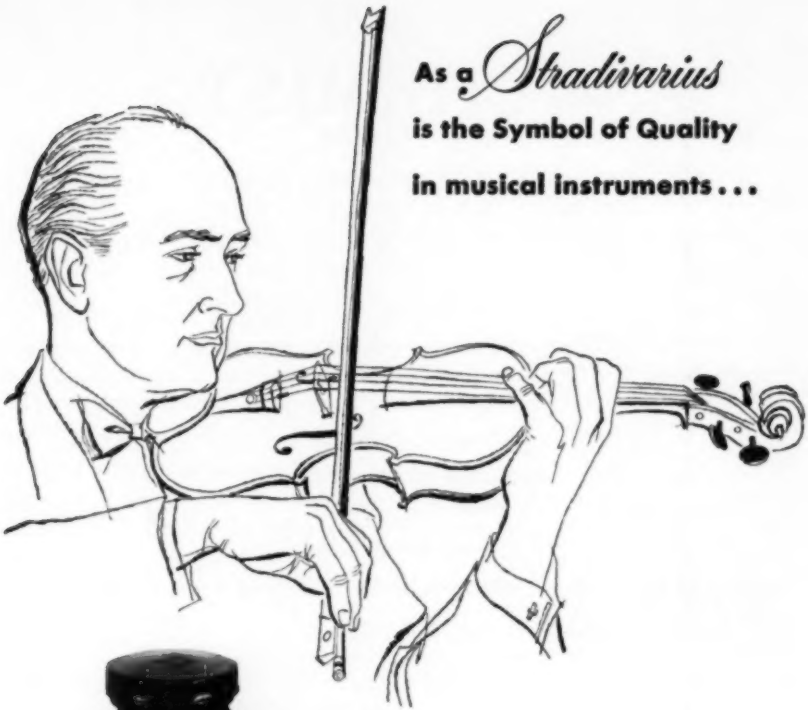

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TO COME

What are the "Psychological and Emotional Problems of Technical and Executive Personnel?" Dr. Lydia Giberson will answer this in the July CHEMIST. The present situation of "Engineering Manpower" will be described by T. A. Marshall, Jr. Dr. Lewis Webster Jones discusses "Some Phases of Education." Other fine Annual Meeting papers will also appear, and there will be a report on the AIC television program arranged by Dr. H. W. Mackinney with Station WATV. Regular departments omitted for lack of space in the June issue will be restored in later issues.

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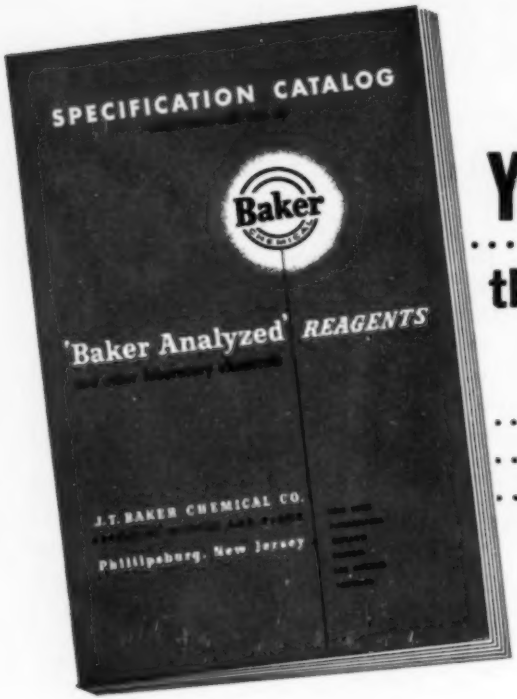

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EDITORIAL

Security vs. the Challenge of a Vital Life

Dr. Lincoln T. Work, F.A.I.C.

Consulting Engineer, 420 Lexington Avenue, New York 17, N. Y., and retiring president of THE AMERICAN INSTITUTE OF CHEMISTS.

"To have and to hold."

IN THIS world, troubled by the unsettled relation between nations, we have developed in undue measure a great feeling of the need for security. Rented homes for which a monthly expenditure must continue to be made; large corporations which must keep their labor costs in line with volume of business and which are particularly sensitive at their present high break-even levels; rapid technologic advance which may quickly render the old business obsolete: these are tremendous forces beside which the individual is but a pygmy. Though a person may rise or fall in a situation beyond his control, these forces are of no greater magnitude than were those faced by hardy pioneers who opened up this country. On the other hand, there are new forces of social responsibility which help to alleviate the impact of sudden change today. It might be well to put this subject of security in its proper place.

The feeling of a need for security in industry is quite general. In recent years, surveys of labor have listed job security as being more important than pay. The guaranteed minimum annual wage is being pressed by unions. One of the major questions of the young technical graduate, when considering a position, has to do with the stability of the job. A large, diversified business or a new business with a promising future possesses elements of attractiveness in this regard. Even the young graduate is interested in insurance and in annuities. Annuities with vested rights are a selling point for a company. As the years pass, technical men tend to become more dependent on security. Some leave industry for teaching positions, with security as one of the major considerations. In spite of the present scales of pay for technical people, taxes and living costs make difficult the accumulation of a reserve to meet the real security needs of a person who has family responsibilities. The speed with which technology is developing creates a demand for those who are skilled in the newer aspects of science and its applications. As some men age, they fail to keep abreast of their field, and they become obsolete before retirement is due. And, finally, the value of a man so often lies in a narrow specialized knowledge of a particular technology that he concentrates on it at the expense of a broader view.

The consequences of these factors are serious. Men lose perspective of their proper place in society. The fear of losing a job dominates their thinking. An aggressive step to serve the company is not taken because the boss might not like it; yet that same boss may fail to promote the man because he is not forceful and aggressive. Stagnation in the job increases, since the mind is incapable of growth as hesitancy and indecision block it. Interest in associating with one's fellows wanes. The scientist gives up his technical meetings, and does his day's work as a chore. On the other hand, the man who matures without the inhibition of fear of insecurity will take the necessary steps for reasonable security — including insurance and reserves, keeping abreast of his field, associating with his fellows both in technical societies and in his community, and watching the growth trends of his broad field — and he will set his sights on a goal of growth for which he is fitted. Such a procedure gets results and an attendant joy in doing his part in service to man. He will take the calculated risk, untrammeled by the fear of loss. He knows that men of his kind and his experience are in short supply, and he knows that he can start again, if need be, without too great a loss. He knows that this thing called security is but a will-of-the-wisp, and that the only real security lies in being strong. His is the self-reliance of the pioneers who advanced carefully into the unknown, depending on themselves to meet circumstances as they arose, in the best way they knew, until they reached their goal.

THE AMERICAN INSTITUTE OF CHEMISTS is interested in people, that they may grow and flourish. The program for the 1954 Annual Meeting is intended to aid in finding the way of life that leads to achievement. If this general program places security in its proper place, it will have been worthwhile.

(Note: Other papers presented at the Annual Meeting appear in this issue of THE CHEMIST.)

AIC Luncheon

The American Institute of Chemists will hold a luncheon on Thursday September 16, 1954, during the annual meeting of the American Chemical Society in New York, N.Y. Dr. E. J. Durham of New York University will be honorary chairman at this luncheon; John Kotrady of the Texas Company will serve as chairman. Dr. Wayne E. Kuhn of the Texas Company will speak on "Professional Standards and Attitude." All AIC members are welcome.

Announced: The appointment of Raymond Szymanowitz, F.A.I.C., as executive vice president of Acheson Industries, Inc., New York, N. Y. He formerly served as vice president.

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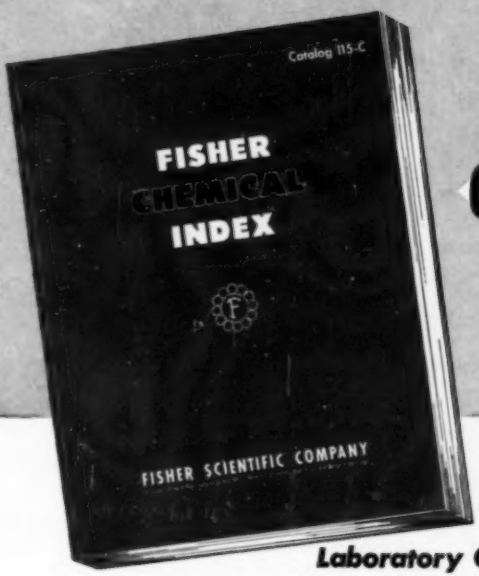

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International Relations in Chemistry

Dr. William J. Sparks, Hon. AIC

Director, Chemical Division, Standard Oil Development Company, Linden, N. J.

(Acceptance address when Dr. Sparks was given the Gold Medal of THE AMERICAN INSTITUTE OF CHEMISTS, May 14, 1954, at Asbury Park, N. J.)

AS A STUDENT at Indiana University, I studied "Theory of Religion" under Prof. Major, the father of the honorary chairman of this Annual Meeting, Dr. Randolph Major. The facts of the course are largely forgotten, but they led to a philosophy of religion. I called it then "The Principle of Concommitant Transmigration"; or, as Emerson said a hundred years ago, "I can find in my biography a part of every book I read." That has come to mean to me that we as individuals are the summation of all the experiences which we have shared with others.

Professor Marvel taught me patience and tolerance, and devotion to truth in science. Mr. Murphree has taught teamwork in organized research. With Bob Thomas, and many others, I have shared in that great technical adventure, Butyl rubber. All of you, members of THE AMERICAN INSTITUTE OF CHEMISTS, have shown me the value of friendship.

Fifteen years ago, my boss in the Department of Agriculture, Orville May, introduced me to the INSTITUTE. In 1939, I became one of the forty-three life members. My faith in the membership of the INSTITUTE has multiplied as many of you have become my personal friends. I accept this Gold Medal as a symbol of what this organization is, what it stands for, what it will be in the future. Let us look to that future as related to the chemist and the world in which he lives. Can individual scientists and private organizations contribute to real international scientific cooperation? As chemists we must not forget what we owe to international co-operation in chemistry.

We must adapt ourselves to an evolving world. We live in a nation dedicated to world cooperation. The U.N., N.A.T.O., F.O.A., and other cooperative agencies are powerful influences in our lives today. Thirty years ago it was sufficient to say that our objectives "shall be to advance the profession of chemistry in the United States of America." Today, that is not enough.

Just one year and a day ago, your medalist for 1953, Dr. J. C. Warner, Hon.AIC., president of Carnegie Institute of Technology, said:

"We must depend more and more on help from our professional people in finding solutions to our problems if we are to go forward and preserve our free society. We must assume a role of responsible leadership in world affairs." Jake Warner went on to

say that it does not seem safe to trust the administration of a modern democratic state to men who are ignorant of the methods of science and of its benefits to mankind. Today we have a simpler problem, namely, the encouragement of exchange of basic knowledge among chemists. (1) Are individual chemists going to play a part in international discussions of basic chemistry? (2) Can this type of international cooperation in chemistry be carried out at the level of individual participation?

In regard to our first question, should individual chemists participate in international chemistry? Why not? They always have. In 1773, the great French chemist, Lavoisier, pointed out the necessity for bringing to perfection the naming of chemical compounds, and started the development of an international language of chemistry. In 1811, Dalton contributed more in England and emphasized the importance of combining weights of the elements. In 1869, Mendeleff, a Russian, carried it farther and classified the elements into our international periodic table. In 1892, forty chemists from many nations met in Geneva and formulated fifty-two rules for naming chemical compounds. In 1930, systematic naming of organic compounds was adopted on an international basis by official action of the Council of IUPAC, meeting in Belgium. The late Marston T. Bogert, former president of IUPAC, said that the universal nature of the language of chemistry is no accident. Cooperation is necessary for progress, and language is the path it travels. Prof. Bogert carried much of the responsibility for the continuing success of the International Union of Pure and Applied Chemistry. Others now active in its support are Albert Noyes, Roger Adams, Ernest Volwiler, and Don Keyes.

Now, in regard to our second question, when talking of international cooperation in chemistry, let us not forget what we can get out of it. A friend of mine was recently asked to name the three most important chemical developments in the United States since the war. He named polyethylene, Dacron, and caprolactam fibers. Each of these, to a considerable extent, originated in a foreign country. I could discuss these examples in detail. However, as I stand among these honored guests, their own contributions appear even more important.

Donald B. Keyes, president of The AIC, helped organize and manage the Technical Industrial Intelligence Committee of the joint chiefs of staff during the last war. This program made thousands of German technical reports available to the American Chemical Industry.

Professor Carl S. Marvel was a member of one of the T.I.I.C. teams. He and John Livingston recognized the importance of the cold rubber process for making GR-S and promoted its successful use in the Ameri-

can synthetic rubber program.

Dr. Egloff, the chairman of your medal committee, can well be proud of his company's development of the platforming process for making high octane gasoline. That, too, was abetted by personal contacts in Germany.

Dr. Randolph Major, honorary chairman of this annual meeting, contributed greatly to the development of antibiotics and to his company's leadership in that field. The first antibiotic, penicillin, resulted from the work of Sir Alexander Fleming and Sir Howard Florey in England.

The first one-hundred tons of GR-S synthetic rubber made in this country were produced in the pilot plant of the Esso Standard Oil Company in Baton Rouge. Mr. Murphree can tell you how important it was for him to have personal knowledge of the earlier work in Europe. He is now president of the World Petroleum Congress to be held next June in Italy.

Finally, let us look at Butyl rubber. Michael Otto was brought to this country from Germany in 1932 by Frank Howard, then president of the Standard Oil Development Company. Otto and Bob Thomas made the first rubber-like polyisobutylene. Without that step, Butyl synthetic rubber could not have been discovered.

These have been illustrations of the immediate past. Of the present, I quote *Time Magazine* of March 29th: "The once broad stream of foreign scientists bringing their ideas and knowledge to the United States has almost run dry."

You see, in answer to our first two questions, historically, chemists of the world have worked together as individuals. Each of us has a genealogical relationship in chemistry which can probably be traced back farther than our family trees. I am a disciple of Prof. Marvel. He, through Roger Adams, represents the Illinois branch of the Harvard School of Organic Chemistry, and so on, back through the history of science.

The first world organization of chemists which grew out of these individual relationships was the International Union of Chemistry. It was founded at the Chicago World's Fair in 1893. This was succeeded by the International Union of Pure and Applied Chemistry in 1919. Its object is to provide an organization to assure permanent cooperation between chemists of participating nations and to contribute to the advancement of chemistry.

Last August, as a member of the United States delegation to the International Union of Pure and Applied Chemistry in Stockholm, I found the technical discussions were informative and inspiring. The numerous committees worked together unravelling the problems of definition and communication. The meeting was a success. But to those responsible for its future, there was a cloud. With the growth of science, the International Union has to "grow

up." Important is the problem of money. The Union is permanently supported by annual contributions from member nations. The total income of the International Union by contributions from member nations was $9,875 in 1950. This amount is barely sufficient to cover printing and postage expenses. Serving, as it does, all of the chemists of the world, IUPAC must have a permanent office and a permanent staff. This would require $30,000 or $40,000 per year.

This modest proposal is not designed to change the traditional activities of the Union. It would provide a center of expediting the work of forty Commissions. It assumes, of course, that the working members of these Commissions would continue their services on a voluntary basis as in the past.

I have already discussed the development of a language of chemistry.

As another example, the present objectives of the nine Commissions of the section on physical chemistry are:

1. To promote and encourage the use of uniform selected symbols and terminology in the field of physical chemistry;

2. To promote and encourage the use of uniform selected values of the fundamental constants in physical chemistry;

3. To promote and encourage (*a*) the improvement and standardization of methods for measuring the physical properties of pure substances, and (*b*) the use of standard substances for calibrating and checking in physico-chemical measurements;

4. To promote and encourage the use of uniform methods of describing physico-chemical phenomena involving large molecules, including nomenclature, measurements of molecular weight;

5. To bring about international accord in the standards, units, and constants of radioactivity;

6. To bring about international accord in matters of nomenclature, the sign of single electrode potentials, standard values of electromotive force of reference cells, single electrode potentials, etc., in the field of electrochemistry;

7. To bring about international accord in the field of experimental thermochemistry, in the selection of values for the heats of formation, entropy, and free energy of formation of appropriate reference substances for tabulations of values of chemical thermodynamic properties;

8. To bring about international accord in matters pertaining to the form of presentation and publication of infrared, ultraviolet, Raman and mass spectral data, nomenclature in this field;

9. To strive for agreement on both theoretical and experimental approaches to studies of kinetics of chemical reactions.

I could read the objectives of the other thirty-one Commissions of the International Union of Pure and Applied Chemistry, but I think this will

show that they deal similarly with basic scientific cooperation. The Union must not be confused in objectives, tradition, or cost with the broader ideas of international cooperation with which we have become acccustomed. For example, such broad international cooperation is carried out in almost every field of human endeavor and the cost is high—about $300 for every man, woman, and child in the United States. However, basic scientific cooperation must come about through the voluntary individual efforts of devoted scientists of all friendly nations. That is the history of cooperation in chemistry. It has always been successful.

The United States delegation at Stockholm unanimously agreed that the spirit of cooperation resides in individuals, that every chemist should be given the opportunity to participate according to his desires. In our country this might be done through action of the American Chemical Society. This was seriously considered last year, with the full support of the then-president of the American Chemical Society, Farrington Daniels. However, positive action by the American Chemical Society in this field presents difficulties to an organization already overburdened with many responsibilities.

Alden Emery, executive secretary of the American Chemical Society, has discussed this in the September 21, 1953, issue of *Chemical & Engineering News*. He said, "It is inevitable now that few scientists find that any one society and any one publication fully meet their needs. Current trends make it almost essential for every man in our profession to belong to at least two societies, and usually more."

In the March 15, 1954 issue of *Chemical & Engineering News*, we asked for suggestions for solutions of these problems of the International Union of Pure and Applied Chemistry. The replies indicated wide interest in creation of a society for support of international scientific relations. That would not be incompatible with the views expressed by Mr. Emery. I now quote item 8 of the objectives of THE AMERICAN INSTITUTE OF CHEMISTS:

> **"To cooperate with all the agencies serving chemistry to make the profession of chemistry a powerful factor in the advancement of intellectual and material progress in the United States of America to the end that this nation shall assume its rightful place as a leader among the nations of the world in scientific thought and accomplishment."**

That was written thirty years ago. Prophetic, isn't it? The United States has assumed leadership among all nations of the world in chemical thought and chemical accomplishment. Having attained that leadership, we must face the responsibilities that go with it. How are we to do this—through further government action, or through voluntary individual support of the International Union of Pure and Applied Chemistry. That

is our problem.

I believe that all of the chemical organizations in this country should join together to support exchange of chemical knowledge among friendly nations.

Members and guests of THE AMERICAN INSTITUTE OF CHEMISTS —I am truly grateful for the honor which you have bestowed upon me in awarding this 1954 Gold Medal of the INSTITUTE and also for this opportunity of discussing with you a problem of deep concern to professional chemists.

Dr. Sparks' Achievements

DR. E. V. MURPHREE, president of the Standard Oil Development Company, spoke on Dr. Sparks' achievements, when Dr. Sparks received the Gold Medal of THE AMERICAN INSTITUTE OF CHEMISTS, May 14, 1954, at Asbury Park, N. J. The biographical information given in Dr. Murphree's talk covered essentially the information below:

Dr. Sparks was born in Wilkinson, Indiana, February 26, 1905. He received the A.B. degree at the University of Indiana, in 1926, thereafter going to work with the Sherwin Williams Paint Company in Chicago (1926-1929). He then returned to Indiana University for the M.A. degree (1929). Following this, he joined R. & H. Electrochemicals (later E. I. du Pont de Nemours & Co.) at Niagara Falls, N. Y. In 1934 he went to the University of Illinois for further graduate study, where he received the Ph.D. in chemistry in 1936. That year he joined the Esso Laboratories of Standard Oil Development Company, where he remained until 1939. During that time he was especially active in the field of polymers.

For a brief period in 1939-40, Dr. Sparks acted as principal chemist and chief of the Oil and Protein Division of the Northern Regional Research Laboratories, in Peoria, Illinois. In 1940, he returned to the Standard Oil Development Company to resume his role in the development of synthetic rubber, and here he has remained. In 1940, he was made assistant director of the Chemical Division; in 1945, he became associate director; in 1946, director. In 1952 he became coordinator of exploratory research of Standard Oil Development Company.

Back in the early thirties, in one of his first technical assignments, Dr. Sparks made several technical discoveries which particularly stand out in the light of present day chemistry. In an investigation of the chemistry of hydrogen peroxide, for example, he discovered its profound effect on the germination of seeds, even under environmental conditions where seeds were not supposed to germinate. This

observation is considered of great scientific importance, though it has gone more or less unnoticed by agricultural workers. Moreover, he made basic observations on the use of hydrogen peroxide in baking. Likewise in his early work, he succeeded in making a clear, hard resin from acrolein, an unsaturate which did not assume commercial importance until two decades later.

During his early period of experimental activity with the Standard Oil Development Company, Bill Sparks played a key role, as co-inventor with R. M. Thomas, in the development of Butyl rubber, the isobutylene - isoprene low - temperature copolymer which was later to play such an important part in the nation's gigantic synthetic rubber program. (To date there have been over a billion inner tubes manufactured from Butyl rubber.) This development also introduced to American chemical industry a radical departure in commercial operations, a continuous polymerization conducted at -110°F. in large-scale equipment.

Among other polymers of note that he pioneered in the late 30's and early 40's were two types which later assumed commercial importance. The first, which he unexplainedly called "T-132," was a high styrene-isoprene emulsion copolymer, a forerunner of the artificial leather and shoe-sole type resins of present day importance. The second was a thermoplastic, film-forming copolymer of isobutylene and styrene of low temperature origin known as "S-Resin." This resin offers significant practical promise and has been brought to the semi-commercial stage.

Even while at the Northern Regional Research Laboratories he could not escape his love of large molecules. There, with other scientists, he did some of the original work on high molecular weight polyamide resins from drying oils, these later figuring in some key industrial developments.

Even after being drawn into the whirl of technical administration, Bill Sparks has continued to hone his keen appetite for scientific discoveries and this very interest has continued to inspire those technical men around him. Possessing a full understanding of the technical man as a scientific thinker, and of the challenge of a dynamic petrochemicals industry, his leadership is recognized and respected by all who come in contact with him.

Professional Interests

Bill Sparks' devotion to the furtherance of the chemical profession and to the welfare of his fellow scientists has been both amazing and inspiring. Amazing because of his inexhaustible ability to be active in so many professional societies at the same time, and inspiring because of his insatiable interest in raising the professional status of the chemist and his society. Even more remarkable it is when cognizance is taken of the de-

manding technical effort necessitated by the key role which he plays in the immense industrial society to which he belongs. (Already he has been responsible for over a hundred journal and patent publications.) Few persons have been able to contribute simultaneously to their science and to their profession so profusely.

The chain of Bill Sparks' society activities goes back to the early thirties when, as an active member of the Western New York Section, he was also editor of its publication, the *Double Bond*. Later he took an active hand in the North Jersey Section of the American Chemical Society, where he held the post of chairman (1946-47). Since 1942 he has served without interruption as a national councilor of the American Chemical Society. He served on the Committee on New Constitution and By-laws (1947) and the Nominations and Elections Committee (1947-51) of the national society, including the chairmanship of the latter committee in 1950. As a rubber technologist of note, it is fitting that he should have been active in both the Rubber Division and in the High Polymer Forum of the ACS. In 1949, he was chairman of the latter group, and was director of the former in 1951.

Also in 1951, Bill Sparks met even greater challenges in furthering the professional aims of his societies by playing key roles in world-wide scientific conclaves which took place that year. He was chairman of the program committee which helped to plan and execute the gigantic and spectacularly successful 75th Anniversary Diamond Jubilee meeting of the American Chemical Society in New York that fall, and he served on the United States Delegation to the XVIth Conference of Pure and Applied Chemistry which ran concurrently.

Through the years, Bill Sparks has maintained a keen interest in THE AMERICAN INSTITUTE OF CHEMISTS. In 1945-46 he was named councilor of the New York Chapter. He has likewise had an active part in the INSTITUTE'S New Jersey Chapter. After the war, his devotion to things professional led him on occasion to Washington where he is active in the affairs of the National Research Council, Division of Chemistry and Chemical Technology. In 1952 he was appointed vice-chairman, and for a while served as acting chairman of that group. In 1953, he became chairman of the NRC Chemistry and Chemical Technology Division.

During the summer of 1953, Bill Sparks spent several weeks on a scientific tour of several European countries. One of his technical responsibilities on this trip was to serve as head of the U. S. Delegation to the International Union of Pure and Applied Chemistry in Stockholm, Sweden.

As if this were not enough, Bill Sparks has found time to keep up active membership contacts with the Society of Chemical Industry, the

American Petroleum Institute, the Association of Research Directors, the Armed Forces Chemical Association, the National Farm Chemurgic Council, The Chemists' Club of New York, and the Cosmos Club of Washington. Last but not least, since college days Bill Sparks was always to be found whenever there was an Alpha Chi Sigma meeting anywhere within travelling distance.

Few chemists have ever nurtured a stronger urge to serve his society, or to dedicate his skills to the benefaction of the professional medium in which he dwelt than has Bill Sparks. His friends know and marvel at his warm understanding of his colleagues' problems, and of his desire to extend his assistance to any who will seek it. But among his most intimate associates there is a common understanding of a quality of vision which does much to establish him in the esteem of all; whenever confronted with a professional decision there is ever-present in his mind, "What will this contribute to society at large?" That indelible principle has been a beacon light which has guided him through the unchartered gulf of scientific exploration.

Dr. William Joseph Sparks

Dr. Carl S. Marvel

Professor of Organic Chemistry, University of Illinois, Urbana, Illinois

(Presented when the AIC Gold Medal was awarded to Dr. Sparks, May 14. 1954.)

It is a pleasure to tell you of an Indiana farm boy who has become an international figure among chemists. I have known him since he entered our Graduate College approximately twenty years ago and worked with me in the laboratory next to my office. We thus became acquainted and the friendship so formed has lasted.

The fact that our medalist is "Bill" to all his friends and associates is significant. He is a sincere and friendly man who likes people and can command their respect while at the same time remaining on a level with them. His ability and his sincerity have set him apart as a leader without making him unapproachable.

Bill comes from a family which traces its ancestry in this country to pre-Revolutionary days. He went to a small school and from early spring to late fall he had farm work competing with school for his energy. When he finished high school he was told he could have a car and work on the farm, or he could go to college. He went to Indiana University where he made an excellent record as a student, especially in his chemistry classes.

It may be interesting to note that his chief competitor for top honors

in chemistry there was a young lady who later became his wife. At that stage they were friendly rivals and no more. Strangely enough both obtained jobs with the same company in Niagara Falls. Neither knew the other was to work with this company until they reported for duty. Their first date came from an accidental meeting at the Canadian Falls. They thus reversed the usual practice of getting married and going to see Niagara Falls; they first went to Niagara Falls and then were married.

The early 30's were not prosperous days in this country, but these two held their jobs during the depression and managed to save enough money to give them courage to return to school for graduate training, which they had decided was needed for advancement in research careers.

Bill is a hard worker and primarily an experimentalist. He plans his work to get the maximum information from each experiment. This trait has always helped him use his time efficiently and has made it possible for him to accomplish more than most of us and still find time for a variety of interests outside his job. It was a pleasure to see Bill gain confidence in himself as a graduate student. He found he could solve a challenging chemical problem and this experience gave him a sort of confidence which has helped him with other types of problems.

He and his wife finished their graduate study at approximately the same time. They came to New Jersey where they have had successful careers as chemists. In addition, they have a family of four children, two girls and two boys. Bill likes to play as well as to work. Although he had taken up golf at Niagara Falls he did not get much time for practice at Illinois; his score (in the 80's) shows that he either is a natural golfer or he did practice more than I thought. He also plays a good game of poker and on more than one occasion has demonstrated to the chemists assembled at various conferences that he understands the laws of chance very well.

When Bill first bought his present house and there was work to be done in the yard, he found someone to do it, saying that he left the farm to avoid that sort of thing. Now, however, he is developing into an interested flower gardener, even if he does not boast of this accomplishment. I doubt if Bill would say that one of his hobbies is bird watching, but he has been on such expeditions and even carried a pair of binoculars on the last trip. It is only fair to say that on most of these trips he has gone along primarily to visit with the more avid "birders."

Bill is a man who is intensely interested in chemistry and chemists. He has taken an active part in the activities of the American Chemical Society, working through the whole range of its activities from local section, the rubber and polymer divi-

Dr. E. V. Murphree, Dr. Egloff, Dr. Sparks, Dr. Work

sions, to important national committee jobs where he has helped with the policy making decision for the Society. He played an important part in the 75th Anniversary Jubilee meeting of the American Chemical Society. It was at this time he became active in the Union of Pure and Applied Chemistry which has led him to his present prominent place in the furtherance of the science at an international level. His devotion to the profession led him to accept the chairmanship of the National Research Council Division of Chemistry and Chemical Technology which is now demanding his attention.

All of these jobs have been accepted by Bill because he likes chemists and chemistry. He is unselfish with his talents, using them freely for the benefit of others. We need more men with his broad vision. It is indeed proper that THE AMERICAN INSTITUTE OF CHEMISTS, whose aim is to further the interest of chemists, has seen fit to honor this man.

Citation To Dr. Sparks

Dr. Gustav Egloff, Hon.AIC

Past President of The American Institute of Chemists and Chairman of the Jury of Medal Award for 1954

YOUR achievements in the science of chemistry are outstanding contributions to mankind, and are in themselves more than enough to merit this Award. But your unselfish devotion to the problems of the chemist and to his betterment have greatly broadened your field of accomplish-

ment. Your name is a most illustrious addition to the roster of recipients of the Gold Medal Award.

It is with sincere pleasure that, on behalf of THE AMERICAN INSTITUTE OF CHEMISTS, I present its Gold Medal to you, William Joseph Sparks, "An eminent chemist who has striven unceasingly for promotion of the science of chemistry and the professional advancement of the chemist."

International Congress: Of Industrial Chemistry, to be held in Brussels, Belgium, September 11-19, 1954. For information: XXVII Congres de Chimie Industrielle, Comite d'Organisation, 32, rue Joseph II, Brussels, Belgium.

Speaker: Dr. Joseph W. E. Harrisson, F.A.I.C., who spoke on "The Fate and Safety of Potassium Sodium Copper Chlorophyllin" at the Symposium on Chlorophyll, before the American Chemical Society, Kansas City, Missouri. A four-page brochure depicting some phases of the work is available from Dr. Harrisson at La-Wall & Harrisson, 1921 Walnut St., Philadelphia 3, Pa.

To Texas: Florence E. Wall, F.A.I.C., consultant, cosmetics, technical writing, 210 East 68th St., New York 21, N. Y., to give a course in cosmetology, July 19-23, at the University of Texas, Austin, Texas.

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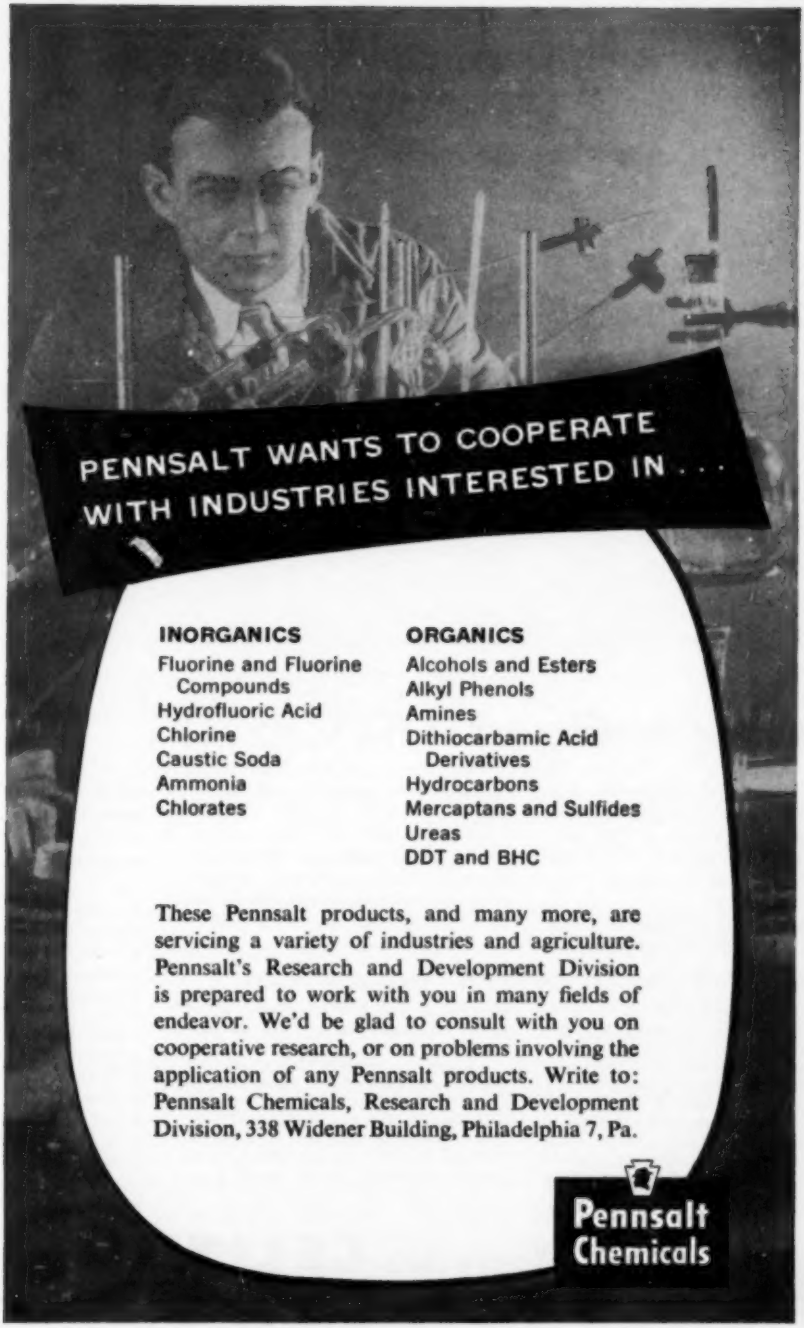
Honored: Dr. Harry N. Holmes, Hon.AIC, professor emeritus of chemistry in Oberlin College, former president of the American Chemical Society, and AIC councilor, who received the first Kendall Company Award in Colloid Chemistry, March 27th, in Kansas City, Mo., during the 125th national meeting of the American Chemical Society. Dr. Holmes isolated vitamin A in 1937, and introduced into this country the laboratory technique of chromatography, among many other achievements. He has received the 1951 Gold Medal of THE AMERICAN INSTITUTE OF CHEMISTS, the Oberlin Alumnae Medal for distinguished service, and the honorary degree of LL.D. from Westminster College.

Promotion: For Marshall W. Mead, F.A.I.C., who is now production superintendent, Columbus Plant, of Oldbury Electro-Chemical Company, Columbus, Mississippi. He was formerly chief analytical chemist for Oldbury at Niagara Falls, N. Y.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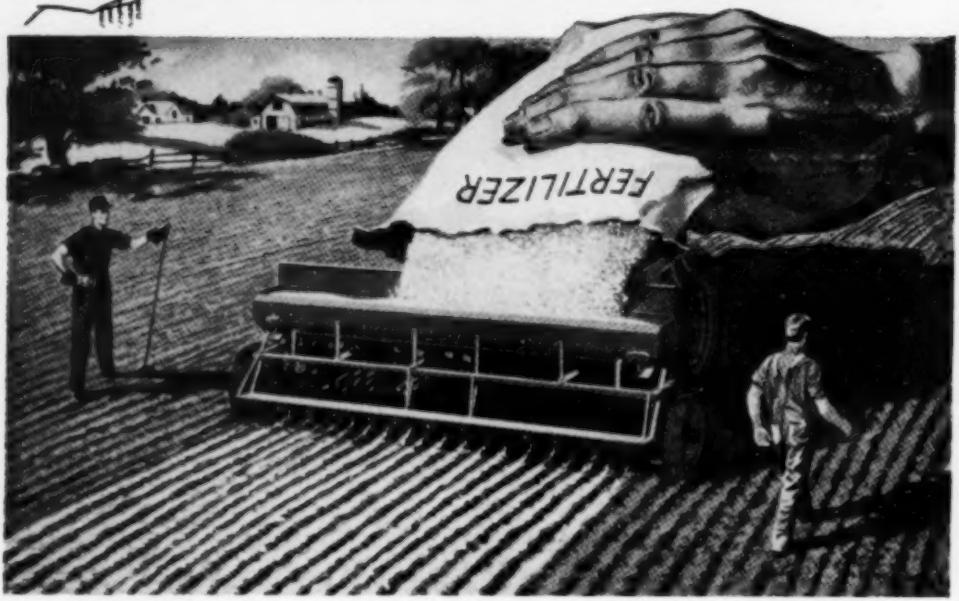

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MINERAL FILLERS

A Suggested New Contract for Chemists

Dr. Lloyd A. Hall, F.A.I.C.

Technical Director, The Griffith Laboratories, Inc., 1415-31 West 37th St., Chicago 9, Illinois, and chairman of the Sub-Committee of the Employer-Employee Relations Committee of AIC.

(Presented at the Panel Session, "The Legal Aspects of a Chemist's Life," at the AIC Annual Meeting, May 13, 1954.)

This important report of the Sub-committee of the Employer-Employee Relations Committee of THE AMERICAN INSTITUTE OF CHEMISTS *includes a proposed form of contract for chemists. Readers are asked to comment on this contract.*

WE OFTEN think of a contract as a formal document, solemnly entered into with strict observance of legal requirements. As a matter of fact, contracts are made every minute of the day—orally, by letter, or by other informal agreement, and these contracts are just as binding, or should be, upon the parties involved as if they covered many printed pages and were duly signed and executed before a notary. A woman boards a street car or bus on the way to her work; she has entered into a contract with the transit company. A wife phones in the day's grocery order; she has made a contract with her grocer. An office manager orders letterheads and other office supplies; he has made a contract with the stationer. What are the facts which make each of these acts contracts? A contract has been defined as an agreement between two or more parties to do or not to do a particular thing, which is enforceable at law. In order to be enforceable at law, an agreement must have the following principles:

(1) Offer and acceptance. An agreement is initiated from an offer or proposal to do or to refrain from doing a certain thing, and from an acceptance of that same proposal. The offer must be clear and definite; it must be communicated in its exact terms to the party to whom the offer is made, either directly or by some definite act; and it must be accepted unconditionally by the person to whom it is made. If the person to whom an offer is made proposes or suggests modifications, these modifications must be accepted by the offeror before an agreement can result. In the figurative language frequently used by the courts, there must be a "meeting of the minds" of the parties as to the terms of the agreement. Further, an assent to the modification may be inferred from the effect that the parties thereafter proceeded to carry on the transaction under the conditional acceptance.

(2) *Competence of parties*: The parties to the agreement must be legally competent to enter into a contract. The question of competency most frequently arises with respect to infants, insane persons, and drunkards.

An infant, legally a person under the age of twenty-one years, is not absolutely incapable of entering into a binding contract. Contracts made by persons under the legal age are not void, but they may generally be voided or disaffirmed by the infant. In the case of contracts which have not been completely carried out, for example, executory contracts, the infant is not bound unless he affirms after coming of age either by words, by sale of property, by retaining it after a reasonable time has elapsed, etc.; failure to affirm implies disaffirmance. In the case of contracts which have been completely carried out, that is executed contracts, an infant may disaffirm either during infancy or within reasonable time after he attains his majority. Failure to disaffirm within a reasonable time implies affirmance.

Insane persons, like infants, are not absolutely incapable of making contracts. Their contracts are voidable, not void, and they may be held liable for necessaries.

A person who is so drunk that he is deprived of his reason and does not understand the nature of his acts is in the same position as a mental incompetent and his contracts may be disaffirmed by him if third persons are not injured thereby, and providing he disaffirms immediately upon restoration of his faculties.

(3) *Legality of subject matter*: An agreement which calls for the performance of an act forbidden by law or inimical to the interests of society is unforceable. Gambling agreements, for example, are generally held to be illegal. In some States any contracts entered into on a Sunday are illegal. Under the Federal Anti-Trust Laws contracts in restraint of interstate commerce are declared unlawful. Under this category, as you can see, there are many other phases of legality which may be involved which would make an agreement unforceable.

(4) *Consideration*: Consideration has been defined as something of benefit to the person making a promise, or something of detriment to the person to whom a promise is made. It is the price or salary, motive, or matter inducing the contract, and may consist of:

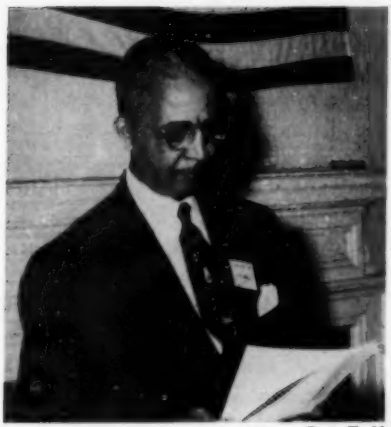
(*a*) Doing some act which one is not obligated to perform.

(*b*) Refraining from doing something that one would otherwise be free to do.

(*c*) Giving some money or property.

(*d*) Giving or making a promise. The value of the consideration given to support a promise is generally immaterial.

I have outlined briefly the condi-



—C & E N

Dr. Hall reading suggested contract

tions and essentials of a contract. Since I am not an attorney at law, this information has been obtained from what I believe is a reputable legal source of high integrity and which has been indicated to me as basically sound. All of these matters were considered in the proposed contract which is involved in this discussion.

Your committee has considered all the contracts that have previously been proposed by Fellows of this organization. We have also solicited the comments of several past chairmen of contract committees and other members of this organization who have been particularly interested in the development of a contract for chemists. The assistance and critical comments of these persons have been of inestimable value to the committee. We have studied and reviewed several American Chemical Society proposed employment agreements, the most recent one published and submitted by the Professional Status Committee of the Milwaukee Section of the American Chemical Society.

In the development of our proposed contract we have attempted to make careful analysis of the equality of protection factor for both employer and employee with particular emphasis on equitable arbitration if arbitration is required and necessary. Also carefully considered has been all the phases of contracts such as employment practice, separation or termination, inventions and development, benefits and mutual obligations, and we have attempted to organize these factors in such a manner that instead of there being separate contracts for various phases of employment practices such as contracts for inventions, for salary, for arbitration, etc., that all are incorporated in one agreement. Further, we have attempted to simplify the contract so that it can be easily understood and adjudicated if necessary by the parties concerned without gross misunderstandings. We feel that mutually agreeable and acceptable contracts are just simply another phase of good human relations between the employer and employee. I suppose this may be the fundamental reason that this committee is a subcommittee of the Committee on Employer-Employee Relations. We all

know that contracts are only as good as the integrity of the persons involved. It is our hope that this suggested contract, if utilized, will be of some value in not only protecting both the employer and the employee, but in enhancing the improved relations of the employer and employee.

The contract which we are submitting reads as follows:

AGREEMENT

By this Agreement, made and executed, this____day of_____, 19__, _____, hereinafter called the Employee, and_____a corporation of the State of_____ hereinafter called the Company, in consideration of the mutual covenants herein contained, agree to the following terms:

1. During the period of employment of the Employee, the Company shall pay the Employee a salary that is mutually agreed upon from time to time at a salary review conference to be held at least once during each calendar year.

2. The Employee shall devote his entire time, skill and best efforts during the period of employment by the Company to such duties as may be assigned to him with diligence and with loyalty, and the Employee shall not perform work for remuneration during this period for any other employer without the expressed consent of the Company.

3. The Company shall receive the exclusive benefit from, and be the sole owner of, all products, processes and other results of the Employee's work relating to the business of the Company which are developed, produced or made by him, in whole or in part, in the course of or as a result of, his employment; and the Employee shall promptly disclose to the Company all such matters and inventions conceived or made by him.

4. Any process or product which the Employee may develop, either solely or jointly with others on his own time and at his own expense, and which does not relate directly to the work of the Employee with the Company or to the business of the Company, shall remain the property of the Employee, but the Company shall be informed of all such before commercial exploitation thereof. It is further agreed that in case of dispute as to whether such subject process or product relates directly to the work of the Employee with the Company or to the normal business of the Company, the dispute shall be settled by arbitration according to Paragraph 11 set forth hereinbelow.

5. Employee further agrees that, whenever requested to do so by the Company during his employment or thereafter, he will execute assignments to the Company or its nominee of any inventions, discoveries or improvements conceived, tested or perfected during his employment and relating to the Company's business. He will execute all papers and perform all other lawful acts which the Com-

pany deems necessary for the preparation, filing, prosecution and maintenance of patent applications and patents of the United States and foreign countries and to transfer of interests therein, including the execution of original, divisional, continuing or reissue applications, preliminary statements, affidavits, or concessions, and the giving of factual testimony with respect to said inventions, discoveries and improvements. All expense connected with developing and patenting said inventions, discoveries and improvements shall be borne by the Company and after termination of his employment, Employee shall be compensated for any service rendered at Company's request at the rate of _____Dollars* per day, in addition to traveling and personal expense incurred in complying with said request.

6. The Employee shall treat as confidential knowledge all Company formulae, specifications, secret processes, and such other information as he may acquire in the course of his employment and the Employee shall not at any time, either during his employment or thereafter, disclose to others, publish or cause to be published any such subject matter without the consent of the Company except as required by law.

7. The Employee agrees to cede and grant and does hereby cede and grant to the Company all right to possession, copying and title in and to any unpublished Company reports, papers or documents or copies, abstracts, or summaries thereof, including drawings, coming into possession of the Employee during and because of his employment.

8. It shall be the policy of the Company to encourage the professional development of the Employee, provide the Employee with the opportunity to attend meetings of professional and scientific societies of which he is a member at the expense of the Company and to encourage the publication of his original scientific work when such publication is not contrary to the interests of the Company. It is expressly agreed by the Employee that he shall at no time publish such work without the express consent of an authorized Company official.

9. In the event of a change in salary proposed by the Company and accepted by the Employee, it shall operate as a substitute only for Paragraph 1 hereof, and the covenants of all other paragraphs shall remain in full force and effect, without change.

10. The employment may be terminated.

(*a*) by the Employee by giving notice in writing to the Company one month in advance, or

(*b*) by the Company upon notice in writing by paying the Employee a sum equivalent to that number of weeks' pay at the rate paid to him immediately prior to such notice,

*AIC suggests a minimum rate of $80 per day.

which equals the number of employment anniversaries but in no case for less than one month.

11. Any controversy or claim arising out of or relating to this contract or the breach thereof shall be settled by arbitration in accordance with the rules then obtaining, of the American Arbitration Association, 9 Rockefeller Plaza, New York, and judgment upon the award rendered may be entered in any court having jurisdiction thereof; or at the option of the Company, or the Employee, said controversy may be referred to a disinterested and mutually acceptable arbitrator, or to a Committee constituted of five employees of the Company, two appointed by the Company and two selected by the Employee, and the fifth to be selected by the four persons chosen. The decision of said Association, arbitrator, or Committee shall be final. The cost of obtaining a decision by any of these methods will be borne by the Company.

12. Inasmuch as the covenants hereto are of such nature that no adequate remedy exists at law for a violation of this contract, it is expressly agreed that this contract and any provisions hereof may be enforced by any equitable remedy.

13. The Company shall not enter into any agreement with another employer which would limit the right of the latter to offer employment to the Employee.

14. Nothing in this Agreement shall be construed to limit Employee's participation in any insurance plan, stock savings plan, profit sharing plan, pension plan, retirement plan, or other employee benefit to which he would otherwise be entitled in the absence of this Agreement.

15. This Agreement shall inure to and be binding upon the successors and assigns of the Company.

IN WITNESS WHEREOF, the Company has caused this Agreement to be executed (and its corporate seal to be hereunto affixed) by its duly authorized officer, and the Employee has hereunto set his hand and seal, this ____day of____, 19__.

Respectfully submitted by

Sub-Committee (Employment Contracts)

Employer-Employee Relations Committee

THE AMERICAN INSTITUTE OF CHEMISTS

Dr. Herman Bloch

Dr. Bernard Friedman

Dr. Helmuth Wegner

Dr. Lloyd A. Hall, *Chairman*

Your committee wishes to thank you for the privilege of being able to work on this project on Contracts for Chemists. We appreciate there may be some corrections which should be made, but we hope that the basic principles of the contract will meet with your approval and acceptance.

(NOTE: Readers of THE CHEMIST are asked to read the above contract carefully and to send their comments to the Committee or to THE AMERICAN INSTITUTE OF CHEMISTS.)

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Patents From A Legal Point Of View

John T. Kelton

Patent Attorney, Watson, Leavenworth, Kelton & Taggart,
100 *Park Ave., New York* 17, *N. Y.*

(Presented at the Panel on "The Legal Aspects of a Chemist's Life," held at the AIC Annual Meeting, May 13, 1954.)

THE SUBJECT of patents is one of considerable breadth and cannot be treated here in large compass. I have selected the two aspects of patents which seem to give both the courts and the lawyers the greatest troubles. These are invention and scope, and it is difficult to discuss one without bringing in the other because they are closely related and impinge one upon the other.

Agreement on the basic purpose of patents, on their practical role in our nation's economic life, is an essential prerequisite to any discussion of patents. In the first place, we may safely postulate that patents have as their only legitimate purpose the stimulation of practical, scientific and technological development. Without prior recognition of the value of practical scientific contributions, patents as we know them today would not exist. Their inception in 17th century England, as well as their survival, attests to their value. When, by the year 1623 in England, the practice of granting monopolies as kingly favors had so far been abused that the English Parliament passed the Statute of Monopolies abolishing all previously granted monopolies, patents for inventions were expressly excepted. The statute authorized issue of such patents for limited terms, granting to persons the exclusive right to make, use or sell any manufacture or art which they had invented or introduced into the kingdom.

This concept of a limited regulated monopoly granted by the state in return for disclosures adding to the sum of human knowledge has long survived and is to this day the keystone of the practice of granting patents for inventions. The proposition is probably nowhere more elegantly stated than in Article 1, Section 8, of our Constitution that:

> **"The Congress shall have power . . . To promote the progress of science and useful arts, by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries."**

Under authority of this constitutional mandate, Congress has provided for issue of patents granting to inventors the exclusive right to make, use and sell their invention for a term of seventeen years. Such patents are granted to "whoever invents...any new and useful process, machine, manufacture or composition of matter or any new and useful improvement thereof."[1] Patents are also granted

for ornamental designs of articles of manufacture and for new varieties of certain types of plants, but with those we are not here concerned.

The basic nature of a patent is indicated again by its two separate portions, the specification and the claims. The specification is the disclosure portion. It must disclose the subject matter, as the statute requires, namely, "in such full, clear concise and exact terms as to enable any person skilled in the art to which it pertains" to practice it.[2] Thus, it is the disclosure portion of the patent which promotes science and the useful arts. The claims of a patent effect the other end of the bargain. They define and measure the area from which the Patent Office has determined that the patentee may exclude others. All of the areas of the disclosure, save those defined by the claims, are dedicated to the use of the public upon issuance of the patent and those reserved by the claims enter the public domain on the expiration of the seventeen-year patent term.

A patent as issued by the Patent Office is presumed to be valid. It is a reasonable presumption that the Patent Office was correct in concluding that the patentee is entitled to exclude others from the area defined by the claims. However, in issuing almost 50,000 patents a year after consideration of many more applications, it is recognized that the Patent Office can and does make mistakes. Protection against such possible error on the part of the Patent Office or against a patentee asserting his claims in unjustifiedly broad scope is vested in the Federal Courts. Anyone charged with infringing the claims of a patent is entitled to dispute in the Federal Court whether the claims cover what he is doing and whether the claims are valid in their asserted scope.

There can be no liability for infringement unless the claims cover what the alleged infringer is making, using or selling. That is the question of scope. But having determined that the claims are of certain scope there can be no liability for infringement unless the claims in the scope accorded them are valid. The question of validity is the question of compliance with law, which in effect is compliance with judicial interpretation of the law. The three primary validity questions are, do the claims define subject matter which is novel, useful and inventive? Novelty and utility are primarily straight questions of fact to be determined from the evidence of the prior art and operation. With the aid of testimony from an expert witness, the facts bearing on novelty and utility may be understood and decided. For novel in the sense of new and utility in the sense of useful are readily understandable concepts. Of infinitely more difficulty of decision is the question whether the subject matter of the claims constitutes invention over the prior art, for invention has turned

out to be a shadowy and somewhat occult concept. The major difficulty in determining whether invention resides in given subject matter is due to the fact that there has never been any satisfactory definition of what invention is. The nearest courts and lawyers have been able to come are statements of what invention is not, and these are not categorically applicable; they have only a part-time truth.

What is Invention?

So the lawyers and the courts, as an aid in measuring invention, have come to explain it in terms of that hypothetical paragon of knowledge who has read everything that is published and patented throughout the world; that flawlessly educated scientist whom we have designated "the man skilled in the art." The test is very simply stated, namely, if the subject matter was not obvious to the man skilled in the art at the time it was discovered, it constitutes invention. On the other hand, if it would have been obvious to this fellow skilled to the art, then it is not invention. This test is comforting only because it is so easily stated. Its application is fraught with difficulty.

One such difficulty is that the man skilled in the art is often allowed a degree of foresight denied the less fortunate remainder of humanity. In other words, in determining the obviousness or non-obviousness of particular subject matter to this hypothetically skilled in the art fellow, we know the result to be attained. It is far easier to find a route to a particular place when you know where you are trying to go. The one who originally located the spot had no such predetermined goal. Often it is the desirability of the particular goal and not the means for its attainment which is unobvious.

This situation of using a hypothetical man as a yardstick is not an unique one in law. Another example is found in negligence cases. In determining whether a defendant was negligent, the test is whether or not he acted as a reasonably prudent man would have acted. As indicating difficulties in application, I am reminded of a case where the Supreme Court of Tennessee felt required to reverse a judgment for the plaintiff in a jury trial of a negligence case. The judge in the court below had instructed the jury that they as reasonable men must determine whether the defendant acted under the circumstances as a reasonably prudent man would have acted. The appellate court reversed the judgment because, they said, while the jury must decide whether the defendant had acted as a reasonably prudent man, it was error for the jury to assume that they were reasonably prudent men.

There we have the imprudent determining what the prudent would do. As respects determination of invention we have a judge, who is most probably totally unskilled in the art to which the patent pertains, decid-

ing what one skilled in that art and having read and understood all pertinent prior publication would have considered obvious, not as of the time of the trial but as of the patentee's date of invention. This difficulty can be overcome by suitable education of the judge by the lawyers and expert witnesses. It is tedious but can be effective.

A greater difficulty today is the indeterminate level of the standard of invention. Handling of "invention" as compared with "obviousness" is a problem of long standing and one which has seemed to defy helpful judicial verbal definition. In 1885, the United States Supreme Court, apparently endeavoring toward clarification, stated that invention as distinguished from obviousness appears "to spring from that intuitive faculty of the mind put forth in the search for new results, or new methods, creating what had not before existed, or bringing to light what lay hidden from vision."[3] In 1891, without measurable clarification, that court defined invention as ". . . that impalpable something which distinguishes invention from simple mechanical skill."[4] Despite the obvious difficulties in defining the concept, it was applied for a number of years with considerable success and at a reasonably constant level.

"Invention" being incapable of successful or helpful definition and its presence or absence being largely sensed rather than determined, the standard of invention is necessarily a variable one. Chemistry would not long flourish on non-constant standards but patents got along quite well on that basis for some time. For many years, with few exceptions, the standard of invention did not depart far from a median line.

Then came the depression when in searching for the elusive key to economic deterioration a substantial segment of the searchers settled on the patent system as blamable for various and assorted economic ills. Hearings by various other government agencies were heard and reported. During this period, there was considerable change in judicial personnel, both in the Supreme Court of the United States and the lower Federal Courts. There seems to have grown up, at least in the Supreme Court, a feeling that a higher standard of invention was required. In other words, that what had been non-obvious to a hypothetical man skilled in the art, must now be considered obvious to him, In 1941, the Supreme Court announced that subject matter to constitute invention "must reveal the flash of creative genius."[5] This pronouncement at the time created quite a flurry in the courts and among the patent bar since it seemed to render non-inventive all save the most exceptional advancement in the art. But it was soon discredited as a helpful guide. However in 1950, some members of the Supreme Court being apparently still undaunted, in a dis-

senting opinion sought to define invention as "to push back the frontiers of chemistry, physics and the like."[8] Thoughtful consideration of the decisions demonstrates that judicial determination and appreciation of the standard of invention is clearly not a science though it is an art.

These judicial onslaughts have greatly increased the standard of the expected skill of the art. While to a considerable extent they have confused rather than clarified the situation, they have nevertheless resulted in considerably increasing the standard of invention which the courts apply today. I believe it is generally the opinion of the patent bar that this trend of increasing the standard of invention, which has been in progress for at least twenty years, has now about expended its force and that at the present time a plateau has been reached which will presumably not be exceeded in the foreseeable future.

Whatever may be the difficulties in determining invention in mechanical or electrical cases, the difficulty in chemical cases is compounded by the judicially accepted fact that reasoning by analogy is much more restricted in the chemical field. Chemistry is acknowledged to be an essentially experimental science with an extremely low rate of predictability as compared with other fields.

Scope of Claims

The second aspect of patents on which a few remarks may be helpful is that of scope of the claims. Scope

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is a sort of one-way stretch. Claims may in proper cases be expanded beyond the literal effect of their language but their scope can seldom if ever be contracted to exclude area which is evidently included in the literal meaning of the claims. That is to say, in a proper case a claim may be construed to cover more than the mere reading of its language would indicate but that a claim which in its literal scope includes or is noninventive over the prior art will not ordinarily be saved by construing it to have a scope smaller than its language indicates.

Under what situations will the scope of a claim be extended beyond the area indicated by its literal meaning? In the first place, we should understand that the language of a claim must be interpreted in the light of the disclosure in the specification, so when we speak of expanding a claim beyond its literally indicated scope, we mean in effect, beyond that scope to which the language of the claim, interpreted in the light of the specification would seem to entitle it.

Expansion beyond literal scope of

the claims is not usual but on the other hand is not rare. It appears to be proper in those situations where the advance over the prior art is established to be somewhat greater than the minimum which the court considers is necessary to constitute invention, or where the departure of the alleged infringer is so slight as to impress the court as being a mere fraud on the patent though arguably avoiding one or more terms in the claim.

As in the case of invention, a verbalism like "the man skilled in the art" has been employed, but gives little aid in solving the question of scope. This verbalism is the so-called "doctrine of equivalents." It is no easier to determine whether a given substance is an equivalent of those defined in the claim for purposes of enlarging the scope of the claim than it is to determine whether the scope of the claim should be regarded as including the particular substance. It is a mere restatement of the problem.

The solution of the question of scope whether it be considered under that name or as a question of equivalents depends, as does the solution of the question of the invention, upon the facts and all the facts of a particular case. There is no categorical answer to either question. Perhaps nowhere is it more true that circumstances alter cases.

The acknowledged relative unpredictability in the chemical field, which I have mentioned as compounding the difficulty in determining invention, tends somewhat to restrict the range of equivalents in claims to chemical subject matter. Of course the acknowledged range of equivalents will be broader in a field where predictability is established than in a field where prediction is unreliable. In the chemical field, the assurance with which prediction may be made varies greatly with the subject matter. In general, it appears that the burden of proving a chemical equivalent is greater than in most other fields. That is to say, the evidence of equivalency must in general be greater or more convincing. Difficulties involved in a determination of a proper range of equivalents are pointed up in the Supreme Court's latest reference to the problem in the Graver case:[7]

> **"What constitutes equivalency must be determined against the context of the patent, the prior art, and the particular circumstances of the case. Equivalence, in the patent law, is not the prisoner of a formula and is not an absolute to be considered in a vacuum. It does not require complete identity for every purpose and in every respect. In determining equivalents, things equal to the same thing may not be equal to each other and, by the same token, things for most purposes different may sometimes be equivalents."**

In that case on the basis of all of the evidence before them, the court concluded that manganese came within the scope of the term alkaline earth metal in a claim. Such a conclusion would off-hand be a surprising one. The particular claim there involved was to a welding flux containing

among other materials alkaline earth metal silicate. The court was apparently impressed with evidence that in the prior art manganese silicate had been employed in welding compositions. The stated basis for the court's conclusion was that:

> "Specialists familiar with the problems of welding compositions understood that manganese was equivalent to and could be substituted for magnesium in the composition of the patented flux and their observations were confirmed by the literature of chemistry."[8]

On the basis of what I have said, you may be somewhat confused and uncertain as to the action of courts respecting patents. You are not alone. Both lawyers and the lower courts have been confused by the rising standard of invention.

There is one comforting conclusion of which the subject seems to admit. It is that by and large the questions of invention and scope of claims in patent cases are decided according to the basic equities as the court sees them. That is, solutions to these questions are reached closely following the application of the concept of natural justice or fair play as it is thought to bear on the particular situation. Equities of the public at large as well as the litigants are considered because patents are peculiarly affected with the public interest. Natural justice and equity, while difficult or impossible of satisfactory definition, are concepts which I believe no patent lawyer would deny are useful, although they are approached largely by feel and intuition based on experience.

Assessment of them is based on the composite effect of all the facts and a feeling for them is really an acquired talent of the lawyer's art.

Thus logical consistency is not necessarily a virtue in the patent lawyers art. No matter how disconcerting its absence may be to his scientist clients, empirical results indicate the necessity for ignoring logical consistency in many instances. So to sum it up, it comes down to the scientifically disconcerting proposition that you must take many of your patent lawyer's assessments of your own or others' patents largely on faith.

[1] Title 35 USC, section 101.
[2] Title 35 USC, section 112.
[3] *Hollister* v. *Benedict* 1885, 113 U.S. 59, 72.
[4] *McClain* v. *Ortmayer* 1891, 141 U.S. 419, 427.
[5] *Cuno Corp.* v. *Automatic Devices Corp.* 1941, 314 U.S. 84, 91.
[6] *Great Atlantic & Pacific Tea Co.* v. *Supermarket Equipment Corp.* 1950, 340 U.S. 147, 152-153, 154.
[7] *Graver Mfg. Co.* v. *Linde Air Products Co.*, 1950, 339 U.S. 605, 609.
[8] 339 U.S. at p. 612.

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Consultative Management

Arthur J. Slade

Rogers, Slade & Hill, Consultants to Management, 551 *Fifth Ave., New York* 17, *N. Y.*

(Presented at the General Session of the AIC Annual Meting, May 14, 1954)

IN A PROGRAM of this kind, it seldom happens that what previous speakers say ties in so directly with, or forms a foundation for, the message of the subsequent speaker. Mr. Marshall brought out the significance of the technically trained people in our industrial economy. He stressed the great national need and the expanding opportunities for the technically trained engineer and chemist. Dr. Giberson gave us a revealing insight into the hidden forces and events which influence the actions and reactions of technical and executive personnel in our industrial organizations. We learned from Dr. Giberson that people have potentials far beyond their normal performance, and to realize these potentials we must strive to give them what they want: Individual recognition, a sense of participation in a worthy project, an opportunity to express themselves, to offer ideas, to differ or to criticize constructively. Deny these and related human urges and you will have malcontents, mediocre performance and stunted development.

I want particularly to register the practice of consultative management as the most effective means to develop managerial talents and to raise overall performance. In our work, as consultants to management, one of the most common complaints of presidents is the scarcity of competent managers. Throughout our industrial organization, management is thin. This is particularly true of the echelon of general management. There simply are not enough able, well-balanced general managers to fill the rapidly growing needs. And we are not developing them at anything like the rate required—or as well as we now know how. The practice of consultative management can be made to pay handsome dividends in this regard, as well as to greatly improve the effectiveness of functional management and, in addition, elevate the level of performance and productivity of entire organizations.

This is not a management consultant's technique; it is rather a philosophy of management, a method of thought and conduct—a way of life. Those who practice it skillfully have found that they manage with far less wear and tear on themselves, much greater satisfaction to their subordinates and with manifold benefits to their corporations.

If management is the science of getting work performed effectively through others, then we might say that consultative management is the

skill of managing constructively and creatively. Constructively, because it develops people, and creatively, because it draws out ideas and fertilizes the whole ground in which ideas germinate.

There are many types of management and many degrees of each type. We are all familiar with the authoritarian type, best exemplified by the military, and still clung to, as we have all seen, by some few companies and many individuals. In many respects, and under certain conditions, the authoritarian type of management can be extraordinarily effective. And in nearly every organization there are occasions when management must exercise its authoritarian powers.

But the type of management necessary for a vast, heterogeneous, compulsive organization such as an army is not necessarily the most successful for a homogeneous, voluntary organization such as an industrial company. Some companies are operated by what amounts to committee management. Some few of these are even successful. I have long felt that such successes are tributes to the individuals, however, rather than to any inherent virtue in committee management, as such.

Consultative management, skillfully practiced, accepts and adapts the essential values of both the authoritarian and the committee types of management but differs radically from each. In sound organization, full responsibility for management must rest on a single individual who must have vested in him the authority essential to the discharge of his responsibilities. He must make his decisions and see that they are carried out. We might say that management is actually a continuous and never-ending series of decisions—big decisions, little decisions, trifling decisions, but constantly, decisions. Competent management is that management which makes an exceptional record of wise decisions—not 51 per cent, but closer perhaps to eighty per cent.

Contrary to the feelings of many managers, however, this singular vesting of responsibility and authority does not automatically endow the manager with all the wisdom, experience and skill required if every decision is to be the best decision. That manager who insists on making all decisions on his own is not a good manager in the broadest sense of management. He works far too hard, doing too many things he should not do; he does not have time to do many of the things the manager should do.

In his organization a manager has a great reservoir of brain power which, if he doesn't tap it, grows stagnant. He is failing to develop his successor. He is depriving able men of the opportunity for managerial growth. He is inadvertently blocking off from his organization the manifold benefits of getting its total job done better, easier, and at less cost, because he is not using the best ideas of the best brains below him. And the

chances are he is fast wearing himself out in the process. That is not consultative management!

For our purpose, we will think of management as including any individual who has responsiblity for the performance of a given group of people. This includes everyone in a supervisory position from president to foreman. If an organization is determined to reap the full benefits of consultative management, every member of management will be encouraged to adopt the practice.

Visualize this organization structure. Here is the president; under him in the next echelon are vice president of engineering, vice president of marketing, vice president of production, and vice president of finance and controls. This will be adequate for our illustration.

If Mr. President is a really competent manager, he will practice consultative management in some degree whether or not he has ever heard of the term. Unless he has deliberately made it his business to develop unusual skill in consultative management, the overwhelming chances are that he and his company are not reaping more than a very small percentage of the potential harvest of available benefits.

Mr. President probably holds a weekly meeting with this group of top executives. These meetings follow the pattern laid down by the President. Plans are reviewed, programs are developed, performance is appraised, and courses of action are determined. Here, with his top group of responsible executives, the president either tells them what he wants them to do, or he sells them on what he wants done, or he consults with them to draw out their individual ideas on what is the best course to pursue. In any event, it is the president's duty and responsibility to make the decision at this level.

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If his decisions are made only after wise consideration of the ideas of those affected, and responsible for execution, that president is personally practicing consultative management. The really competent manager will recognize those few occasions when he must tell them; the more frequent occasions when he needs to sell them his ideas, but in general practice on significant matters, he will consult with them.

Such a president will find, in the early stages, that he has cut out for himself a man-sized job. It takes more than courage and perseverance to get subordinates, at any level, to disagree with the boss on the basis of logic. It requires an understanding of the individual human being involved and a skill in human relations that few

managers possess the patience to practice. But, as in golf, skill can be developed by determined practice and the dividends can be highly rewarding.

If the function of management could be reduced to a mechanical or electronic process, there would be no need for consultative management—and certainly no need for management consultants either, But as long as organizations are made up of people—the most complex of chemical-electro-mechanical organisms—we are going to require human managers. And we are going to judge of their competency by the totality of the results they achieve through their organizations.

We left our example president practicing consultative management at his level. But if his whole organization is going to turn in its best possible performance, the same practice must be carried right down the line to the rank and file workers. Their best ideas will be constantly sought by the foremen. The president who can achieve a comprehensive program of effective consultative management need have no concern for the security, growth, and profits of his company.

Whether you are president of your company, vice president of research and development, head of the laboratory, project manager, section head or trainee, you can benefit personally from the practice of consultative management. Nothing I know of tends more surely to mature one's sound judgment than to seek and appraise the ideas of others. It is amazing how many good ideas and how much sound judgment can be found in other people's minds, but we must open their minds and our own, if we are to share the values available. The responsibility for this rests with the manager.

The whole value of a manager can only be measured accurately by the yardstick of his whole responsiblity. Many sections of this yardstick are frequently overlooked or ignored until some emergency arises. The able but lopsided manager may do a fine job of getting out production, reducing costs, selling the plant's output, developing new products or running the fiscal affairs of the company. Emergencies, however, may reveal that: (1) He has developed no competent successor. (2) The morale in his organization is sub-normal. (3) He has been losing several key people—real comers. (4) Labor troubles are frequent and always incipient. (5) His department's total program never quite comes up to expectations. (6) He fails to demonstrate the leadership characteristics essential to competent management.

Seeking advice and counsel is not indicative of a lack of self-confidence; it is a manifestation of intelligence! Anyone who acts as though he felt he has all the best answers to his problems is a supreme egoist and frequently a very dangerous manager. We all have blind spots, of which we are generally unaware. Consult for two reasons, to improve the quality

of your own decisions and to help develop the judgment of your associates. Many men who might otherwise have turned out to be lopsided managers have found in consultative management a generous education in human relations and have gone on to remarkable success.

Many presidents are finding that the practice of consultative management, in addition to all its other advantages, constitutes an organization microscope through which they can detect and observe men of unusual promise, men who otherwise might be overlooked for years. The same microscope can be used effectively to identify what specific training or executive development programs are required to accelerate managerial growth.

Speaking for our firm, I can tell you that some of our deepest satisfactions come from observing the accelerated developments of managers, managers-in-the-making, and the uptoning of entire organizations where we have been invited in to counsel with top management in initiating or coaching in the process of consultative management.

In summary, through consultative management, we have the opportunity to:

1. Raise the effective performance of the entire organization.

2. Avoid most of the costs of unwise decisions.

3. Identify for broader responsibilities individuals of unusual promise.

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To all of you in management or who aspire to management, I commend consultative management, call it what you will.

Drive: Sponsored by The American Chemical Society, to collect funds to install a bust of J. Willard Gibbs in the New York University Hall of Fame. Checks to thus honor this great chemist (the first chemist to be chosen by the Hall of Fame) should be sent to Arthur B. Kemper, Manhattan College, Riverdale 71, N. Y. Full details are in *Chemical & Engineering News,* May 17, 1954, p. 2024.

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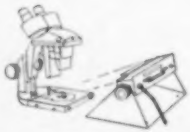

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Our Thirty-First Annual Meeting

THE 1954 Annual Meeting of THE AMERICAN INSTITUTE OF CHEMISTS was unique among meetings in that all papers and programs centered around chemists and their lives, while the science of chemistry was not discussed at all. The New Jersey Chapter was the enthusiastic host for this memorable meeting, May 12-14, 1954, held at the Berkeley-Carteret Hotel, Asbury Park, N.J., with a total attendance of three-hundred persons. David W. Young, general chairman of the meeting was assisted by Dr. W. A. Raimond, Chester A. Amick, Dr. L. T. Eby, Dr. W. R. Sullivan, Dr. Max Bender, Theodore R. Donlan, Erving Arundale, John M. Young, A. J. Mostello, Dr. S. E. Ulrich, and others.

The first day, "Jersey Day," featured golf, tours, President Work's reception to the National Council, meetings of the Board of Directors and the National Council, and colored movies of "New Jersey Journeys" and underwater scenes. *Tour A* went to Lenox, Inc., Trenton, N.J., where Mrs. Isabel Brooks was narrator for a movie of manufacturing operations, and guide for a showroom exhibit of exquisite china. *Tour B* was a trip to the Naval Air Station at Lakehurst, N.J.

At the Annual AIC Business Meeting on May 13th, the election of new officers and councilors was announced: President-elect, Dr. Ray P. Dinsmore, vice president in charge of research and development, The Goodyear Tire & Rubber Company, Akron 16, Ohio; Secretary (re-elected), Dr. Lloyd Van Doren; Treasurer (re-elected), Dr. Frederick A. Hessel; Councilor (re-elected), Dr. John R. Bowman, and Councilors, Dr. Emil Ott, director of research, Hercules Powder Company, Wilmington 99, Del., and Dr. William J. Sparks, director, Chemical Division, Standard Oil Development Co., Linden, N.J. Dr. Donald B. Keyes as president-elect for the previous term succeeded Dr. Lincoln T. Work as AIC Preesident.

The AIC officers, the chairmen of the twelve Chapters of the INSTITUTE and the chairmen of the Committees, presented reports to the Annual Meeting. (These reports will appear in this and later issues of THE CHEMIST.) The amendments to the Constitution were approved. (Ratification ballots have since been sent to Fellows of the INSTITUTE for their approval before the revisions can be adopted.) Dr. M. L. Crossley and Dr. Harry L. Holmes paid tribute to the INSTITUTE'S first president, Dr. Horace G. Byers. The president, Dr. Donald B. Keyes, was asked to appoint a committee to prepare a history of the INSTITUTE, to be available for the thirty-fifth Annual AIC Meeting. He appointed Dr. M. L. Crossley as chairman, and charter

REGISTRATION DESK

Misses Perantoni, Barbieri, Dr. Ulrich, Chester A. Amick, registration chairman, and Mrs. Webb.

members, Dr. Lloyd Van Doren, Florence E. Wall, Albert P. Sachs, and Dr. John A. Steffens as members. Life membership in the AIC was presented to Vera Kimball, in recognition of twenty-five years of service to the INSTITUTE.

Informal Luncheon

At the Informal Luncheon, Dr. August Merz, consultant, American Cyanamid Company, Bound Brook, N.J., entertainingly briefed chemists on "The Historical Background of Chemical Industry in New Jersey."

In the afternoon, Dr. George L. Royer, chairman of the AIC Committee on Employer-Employee Relations, and administrative assistant to the general manager, Research Division, American Cyanamid Company, Bound Brook, N.J., presented a panel on "The Legal Aspects of a Chemist's Life." Dr. Lloyd A. Hall, technical director, The Griffith Laboratories, Inc., Chicago, Ill., discussed a proposed contract for chemists. (This contract is still being revised. Dr. Hall's paper is published in this issue of THE CHEMIST and readers are asked to send in their comments for consideration.) Richard H. Gregory, Jr., councillor-at-law, Union Carbide and Carbon Corporation, treated contracts from a general point of view; John T. Kelton, patent attorney, Watson, Leavenworth, Kelton & Taggart, New York, N.Y., spoke on "Patents from a Legal Point of View" and W. E. Fairbanks, general counsel, Thomas J. Lipton, Inc., Hoboken, N.J., described some of the interesting things that happen when employees consult him on "The Law and Personal Problems," which include the legal acts involved in buying a house, accidents, contracts, rental agreements, purchasing a car, and other situations.

Pretty Miss Hilda Cook, fashion consultant of the Celanese Corpora-

tion of America, displayed lovely, new man-made fabrics to the chemists' wives and gave them tips on washing and caring for acetate fabrics. Chemists and their wives then joined at a social hour, where, through the courtesy of Thomas J. Lipton, Inc., a special Darjeeling tea was served. This successful innovation of a tea hour was confirmed by a full attendance and an emergency call to the hotel staff to provide additional cups.

The Professional Facts

An informal Chem-Quiz on the "Professional Facts of Life" followed a buffet supper in the evening. Quizmaster Savery F. Coneybear, associate research director, Colgate-Palmolive Co., Jersey City, N.J., kept a lively discussion moving after Dr. D. L. Cottle, research chemist, Standard Oil Development Company, reported on the personal lives of chemists. The results of a survey of the members of the New Jersey Chapter showed that chemists are quite similar to other college-trained people. Their civic interests and activities are normal. Even their views on religion are normal despite a popular view that scientists are prone to be atheists. Chemists take pride in their families, home, and community, as well as a satisfied interest in their work. Chemists, as other college graduates, have two children per family. The divorce rate is the same. Chemists' extra-curricular activities in college were fully as high as others, including varsity sports, music, politics, and school paper. Dr. Marston T. Hamlin, F.A.I.C., of American Home Products Corporation, New York, told of his early experience as chairman of the New York Chapter, with the formulation of the first Committee on Employer-Employee Relations. Dr. Max Bender introduced the program and contributed to it. (He did not coin that word "nebulosity" as some thought. It is in the dictionary!)

Education

Dr. Harvey A. Neville, dean of the Graduate School of Lehigh University, Bethlehem, Pa., moderated the May 14th panel on "Education for the Chemical Profession." Dr. Hubert N. Alyea, professor of chemistry at Princeton University, delighted his audience with his discussion of undergraduate training. Dr. Henry B. Hass, president, Sugar Research Foundation, New York, N.Y., and former head of the Department of Chemistry, Purdue University, spoke on graduate training. Dr. Thomas H. Vaughn, vice president for research and development, Colgate-Palmolive Co., Jersey City, N.J., spoke on "Continuing In-Service Study." Technical literature and professional societies play the largest part in the dissemination of advanced technical knowledge to those working in the chemical field, he pointed out. "Study never ends for the professional chemist." Dr. Per K. Frolich, vice president for scientific activities, Merck & Co., Inc., Rahway,

Dr. Donald B. Keyes, Prof. Carl S. Marvel and David W. Young. Dr. E. V. Murphree, Dr. Gustav Egloff, Dr. W. J. Sparks, Dr. L. T. Work, and Dr. Randolph Major.

N.J., concluded the panel with a discussion of "Education on the Part of Chemical Industry."

Honor Recipient's Luncheon

Dr. Randolph T. Major, vice president, Merck & Co., Inc., honorary chairman of the Annual Meeting, was toastmaster at the Honor Recipients' luncheon. Dr. Sidney D. Kirkpatrick, chairman of the Committee on Honorary Membership, announced that during the fiscal year 1954-55, honorary AIC membership will be presented to Dr. Horace G. Byers, of Arlington, Virginia, first president of THE AMERICAN INSTITUTE OF CHEMISTS; to Dr. Milton C. Whitaker, former vice president and director of American Cyanamid Company, and to Dr. Paul D. V. Manning, vice president in charge of research for International Minerals and Chemical Corporation, Chicago, Ill. The presentations will be made at times to be decided later.

Among previous Honor Recipients who attended the Annual Meeting were: Dr. M. L. Crossley (Gold Medal, 1947); Dr. Ray P. Dinsmore (Honorary Member, 1953); Dr. Gustav Egloff (Gold Medal, 1940); Fred J. Emmerich (Gold Medal, 1952); Dr. Sidney D. Kirkpatrick (Honorary Member, 1952); Dr. Harry N. Holmes (Honorary Member, 1938); Dr. Alexander Schwarcman (Honorary Member, 1948), and Dr. Peter A. van der Meulen (current recipient of the New Jersey Chapter Honor Scroll). At the conclusion of the luncheon, Dr. Lincoln T. Work presented Honorary Membership to Dr. William J. Sparks, 1954 Gold Medalist.

General Session

Dr. Lincoln T. Work, retiring AIC president, presided at the General Session and presented its provocative theme, "Security Versus the Challenge of a Vital Life." (See editorial). T. A. Marshall, Jr., formerly secretary of Engineers Joint Council and executive secretary of the Engineering Manpower Commission of Engineers Joint Council, discussed "Engineering Manpower: The Current Picture." Dr. Lydia G. Giberson, psychiatrist and personal advisor to the Metropolitan Life Insurance Company, spoke on the "Psychological and Emotional Problems of Technical and Executive Personnel." Dr. Lewis Webster Jones, president of Rutgers University, New Brunswick, N.J., discussed "Some Phases of Education." Arthur Slade of Rogers, Slade and Hill, New York, N.Y., spoke on "Consultative Management."

Gold Medal Dinner

Following the reception to the medalist, given by Standard Oil Development Company, nearly two-hundred and fifty persons attended the dinner to Dr. Sparks. Dr. Lincoln T. Work was toastmaster. Dr. Carl S. Marvel, professor of organic chemistry, University of Illinois, Urbana, Ill., and Dr. E. V. Murphree, president of Standard Oil Development Company, spoke on Dr. Sparks' achievements. Dr. Gustav Egloff, former AIC president and chairman of the Jury of Medal Award, presented the Gold Medal to Dr. Sparks.

Honors For The Editor

Reported by Florence E. Wall, F.A.I.C.

AS THE last item on the agenda for the Annual AIC Business Meeting, May 13th, President Work announced a testimonial to Vera F. Kimball, editor of THE CHEMIST. The citation was:

> Vera Kimball, in recognition of twenty-five years of service to THE AMERICAN INSTITUTE OF CHEMISTS, during nineteen of which you have been editor of THE CHEMIST, and in sincere appreciation of all that you have done in every way to help all of us in the efficient management of our INSTITUTE affairs, the Council unanimously awarded you a paid-up Life Membership in the INSTITUTE. It is therefore my privilege to present to you this certificate of membership, and express to you my great pleasure in welcoming you to actual membership in our organization after these many years of devoted service which showed that you were always one with us in spirit.

With characteristic modesty, Miss Kimball accepted the framed certificate of Life Membership and instead of making a formal address, she asked Dr. Work to read the following letter with which she had acknowledged the announcement of the award:

> Please express to the National Council my deep appreciation for

the honor symbolized by this certificate of Life Membership. I am especially grateful because it is a privilege above those I already enjoy.

It is realized that many persons do not like their work or are bored by it. However, my work is enjoyable and boredom can never exist in any place where there are many things to do. In fact, in twenty-five years I have not been able to catch up with them. Many require much miscellaneous information, but this continuous quest for knowledge serves to maintain one's interest, and perhaps it may be said, increases the horizon of one's ignorance.

The privilege of working with understanding people has been and is also mine. Chemists in general, as Dr. Cottle will probably tell us at this Annual Meeting· are such people: Intelligent, educated, frank, without affectation, individualistic, and tremendously creative. From them I have learned much and I value their friendship highly.

Twenty-five years ago, the INSTITUTE had 600 members, dedicated to doing something about professional matters. They gave time, writing ability, speaking talents, ideas, and inspiration to these problems. Through the years, many others joined to help, and though the way has been difficult at times, the INSTITUTE and its influence grew. The INSTITUTE has already sparked great changes in public attitudes toward chemists, in managements' evaluation of chemists, in chemists' attitudes toward themselves. As professional consciousness increases among chemists, their power to create and to accomplish is increased and a favorable environment for creative minds is provided.

During the years, officers, councilors, chapter representatives, chapter officers, committee members, and volunteers, have given many man-hours to the profession. As these officers, chapter officials, committees, changed from year to year, each new person has brought his or her special talent to enrich the INSTITUTE still further. Many AIC members have achieved outstanding positions in industry, universities, other societies, where they continue their influence for the profession. Though the INSTITUTE is small it is a potent force. A translation of a poem by Radhakrishna is perhaps applicable here:

Dr. Work presents certificate to Vera Kimball

"Growth is slow when roots are deep.
But those who light a little candle
In the darkness will help to
Set the whole sky aflame."

The INSTITUTE is a fine vantage point from which to watch a great living drama with many participants. Here are some things I have seen:

Young, timid chemists, seeking positions, who later became leaders in their fields.

Domineering and inconsiderate men who mellowed with time and wisdom into kindly, helpful persons.

Humble laboratory workers who by diligence and personal improvement matured into men of prominence.

Selfish men who learned that cooperation and helping others is a

surer way to success.

A great united team of scientific persons who quietly made it possible to produce the materials necessary to win a terrible war (though the credit was often publicly ascribed only to the theoreticians).

Companies with few products that expanded, as a result of good research departments, to become manufacturers of many products.

A paper in the literature that became the basis for a big business. (There is pirates' gold in that voluminous literature.)

A young chemical industry, relying on the work of chemists and chemical engineers, teamed with business talent, that expanded into the giant it now is.

And a small organization, devoted to professional activities, that has benefited chemists today and will bequeath richer tomorrows to chemists of the future.

May I thank you again for this honor. It provides such heartwarming encouragement that surely I must become more worthy of it in the future.

The President then called on Miss Florence Wall to continue from that point; which she did as follows:

Thank you, Mr. President; late as it is, I would not wish to miss this opportunity to have the last word. After that worthy and richly-deserved citation, any remarks from me might seem like mere anti-climax, but I wish to speak my piece anyway.

What you have heard has told you about Miss Kimball in her association with the INSTITUTE, but nothing about herself. Not that I would ever be guilty of perpetrating one of those funereal-like orations on "Vera Kimball, the Woman," like those on "So-and-So, the Man" which we hear on many similar occasions; but it is high time that the membership should know more about this rather remarkable person who has for twenty-five years been the efficient, dependable, discreetly self-effacing administrative assistant to the INSTITUTE. She has "always been around," as the "Extra Brains" for every President, the "Extra Right Hand" for the Secretary, the Treasurer, and whoever else needed one.

As you look at Vera Kimball, you are probably looking at the first native Alaskan you have ever known. Her father (from Pennsylvania) and her mother (from Iowa) had gone to Alaska from Oregon a few years after the gold stampede, and she was born at Resurrection Bay in what is now the city of Seward. (I do not say when; after all, we girls have to stick together!) She was graduated from the high school at Anchorage in 1922 and worked for a few years in various government offices—as telephone operator for the city of Anchorage; as a stenographic clerk for the Territorial Government of Alaska, and for the United States Government. In 1925 she entered Barnard College, in New York, from which she was graduated (extra credits for excellent work!) in 1929. In July of that year she was engaged by President Breithut as a general assistant on AIC affairs, and was tucked into an office in the Woolworth Building, under the kindly and efficient eye of Howard Neiman, our long-time National Secretary. And it was there that I met her, a few months later, when I fell heir to the editorship of THE CHEMIST, among other INSTITUTE activities of Albert Sachs.

The reason I requested (practically usurped) the privilege of making these remarks is because although I was not the first editor with whom Miss Kimball served—maybe I can say that of all of us who were around then and are around now, I have know her "the best, the longest."

When, in 1935, after two years of full responsibility as "assistant to the editor," it was decided to give V. F. Kimball the position of editor—to let her have "the name as well as the game," as it were—there was some comment here and there because she was not a chemist.

The best answer to that was then, and still is, "So what?" She had acquired enough chemistry through geology and other courses to enable her to work all during her college course as a technical secretary to various professors in the Columbia School of Engineering, notably, W. D. Turner, Colin Fink, D. D. Jackson (the dean, himself) and our retiring president, then Professor Work. There were summer jobs, too, with the North American Newspaper Alliance, General Foods, and Todd, Robertson, Todd.

I had forgotten until recently, that with a minor in English and assorted useful courses in psychology, philosophy, economics and languages, Vera Kimball had majored in, of all things, anthropology! The study of man! What could be better background for a career with the American Institute of *Chemists* —not *Chemistry?* It was Dr. Breithut, you may recall, who used to say, "Other professional societies aim to make a chemist out of a human being; the AIC aims to make a human being out of a chemist." As she could, she took various courses, with the Advertising Club of New York (where she was sometime editor of the class alumni bulletin), with the Employing Printers' Association, and whatever else might be helpful to her work. It all fits together beautifully.

During her first quarter-century with the INSTITUTE, I have seen Miss Kimball weather many ups and downs . . . She assisted with the employment program of the INSTITUTE during the depression and was co-author with M. R. Bhagwat of the monograph, *Your Future in Chemistry.* Another writing activity since 1948 has been as a regular contributor to the *World Scope Encyclopedia* and *World Scope Yearbook* on developments in chemistry. Well, through it all she has always been there—a "Miss Gibraltar" to whoever needed moral support.

How this indefatigable person could ever fit any personal living into twenty-five years of such a merry-go-round is a wonder, but she has managed to do that, too. Back in 1942, as quietly and effectively as she does everything else, she slipped off and married William T. Castles (of Chester, South Carolina), then with *The New York Sun,* who has been her steady escort at our AIC affairs since then, and with whom she co-authored the book *Firearms and Their Use.* (Stand up, Colonel, and let everyone here know you.)

Miss Wall (right) presents gifts.

So that brings us up to date on our blushing jubilarian. In closing, I feel like the preacher who, after his congregation had nearly busted itself in prayer and song, said, "That's just fine! I'm sure the good Lord appreciates your enthusiasm. Now let's pass the basket and worship him more substantial."

Vera Faith Kimball (surely you were named with prophetic vision!), that certificate of membership is a nice piece of paper to hang on a wall, but we wish you to know that we also "appreciate you more substantial." I am happy that in my last official act as I retire from the Council I have the great pleasure and privilege of pre-

senting to you these more tangible tokens of remembrance with the sincere good wishes and affection of us all.

Miss Wall then handed to the astonished Miss Kimball a large box, wrapped in silver paper and tied with the INSTITUTE'S colors, which proved to contain a silver tray, appropriately marked for the occasion. An additional souvenir was a book of letters from living past presidents and former editors of THE CHEMIST with whom she has served, and from the retiring national officers. The frontispiece was a photostatic reproduction of signatures of all the past presidents and former editors, living and dead.

The letters by past presidents were from: Frederick E. Breithut (1928-1932); M. L. Crossley (1934-1936); Harry L. Fisher (1940-1942); Gustav Egloff (1942-1946); Foster D. Snell (1946-1948); Lawrence H. Flett (1948-1952); and Lincoln T. Work (1952-1954). The former editors were Albert P. Sachs (1928-1929) who gave THE CHEMIST its name; Miss Florence E. Wall (1929-1931), and Edward L. Gordy (1931-1934). Mr. Gordy's greeting was so unusual that it is printed here in its entirety:

(While browsing through a library recently I ran across one of the less well-known volumes written by Robert W. Service. It contained the poem given below. I had not previously realized that you knew Mr. Service, or that he had once been a chemist. However, scientists are trained not to be astonished by any phenomenon.)

The Vicissitudes of Vera

Oh, an editor's life is storm and strife,
Her mind must needs be nimble.
And the Institute was quite astute
To capture Vera Kimball.

This bairn was born in a land forlorn
That seldom sees the sun,
Where she sought the lair of the polar bear
And laid him low with a gun.

When she ventured forth from the frozen North
And hunted higher knowledge,
Manhattan seemed the place she'd dreamed,
She came to Barnard College.

And in '29 our luck was fine,
She heard our call for aid.
Though printer's ink can drive to drink,
This gal was not afraid.

Now chemists are great, they really create
But they're not so hot when they write.
With the best intent, the stuff they sent
Was not a deep delight.

But she took their trash and added a dash
Of flavor and zing and spice.
Contributors read what they wished they'd said,
It sounded smooth and nice.

A chemical group is always a troop
Of argumentative birds
Who yell and complain, agayne and agayne
And utter unspeakable words.

But our editor soothed and softened and smoothed
The barks of the battlesome crew.
In place of a yelp, they wanted to help
And so the Institute grew.

We think she's swell, we wish her well
And all can comperhend
The honors deserved to one who has served—
A toast to our able friend!

For an editor's life is storm and strife,
It's tougher than pushing a thimble.
And the Institute was indeed astute
To capture Vera Kimball!

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Chemistry Teachers Conference: To be held at the University of Wyoming, Laramie, Wy., July 19-August 20, 1954. The conference theme, "Advancement in Chemistry Teaching," will be treated by discussion and lectures by well-known leaders. Especial attention will be given to the incorporation of recent advances in chemistry into the secondary-school course. The Conference will draw freely on the resources of the Chemistry Institute, an ACS project for college chemistry instructors that meets concurrently at the same campus.

The Conference is sponsored by the Committee for the Advancement of Education. Grants up to $150 per teacher are available for sixty teachers to help defray expenses. The director of the Conference is Elbert C. Weaver, F.A.I.C., of Phillips Academy, Andover, Mass. Registration application blanks and information may be obtained from the Associate Director, Chemistry Teachers Conference, University of Wyoming, Laramie, Wy.

Announced: By Dr. H. G. Johnson, F.A.I.C., director of the Development Department of the Research and Engineering Division of Monsanto Chemical Company, St. Louis, Mo., the appointment of Dr. W. S. Emerson of Dayton, Ohio, as assistant director of the department.

COUNCIL

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President-elect, Ray P. Dinsmore
Secretary, Lloyd Van Doren
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Albin H. Warth, *Baltimore Chapter*
L. T. Work, *Past President*

President's Report—1953-1954

Dr. Lincoln T. Work, F.A.I.C.
Retiring President, THE AMERICAN INSTITUTE OF CHEMISTS

(Presented at the Annual AIC Business Meeting, May 13, 1954, at Asbury Park, New Jersey)

AT THE close of the two-year period during which I have served as your President, I can report definite progress in the consolidation of the business and administrative operations of the INSTITUTE, in the broadening of its base for stronger Chapter activities, and in the effective handling of many matters of the chemists' welfare, which are the primary functions of the INSTITUTE.

Membership

Careful, well organized planning of solicitation for the kind of new members who should be in the INSTITUTE was arranged under the chairmanship of John H. Nair. The supporting organization involved leaders in a variety of technical fields, and it involved the services of Chapter membership chairmen. The results though effective are not a measure of the real value which has been attained, since the INSTITUTE now has more people who are membership conscious who will continue to help in the years ahead, and since the tightening of the membership lists resulted in a net loss which had to be overcome before these gains which have been made could be counted. A year ago the society showed the effect of dropping members who had ceased to pay dues, and doing so promptly at the end of the period which the rules prescribed. The President wishes to express his appreciation of the excellent work done by the membership committee in giving what is in effect, a ten per cent increase in membership during the two-year period.

Finance

A year ago the dropping of delinquent members produced a serious financial balance. The deficit on a cash basis was small, but on an accrued basis it appeared abnormally large. Our accounting was modified so that we could follow figures on a cash basis as well as on an accrual basis. This year, with the help of a finance committee and frequent meetings of the Board of Directors, close adherence to a detailed project was attained. The net situation over the past two years is favorable and there is a foundation for the future.

The Chemist

Our publication has presented effectively a great amount of worthwhile information. Its editor, Vera Kimball, is completing her twenty-fifth year of association with the INSTITUTE, about twenty of which have been as editor. We have shown our appreciation by conferring upon her the honor of life membership.

Honorary Members

During the past year it has been the pleasure of your President to present certificates of Honorary membership to Dr. Francis J. Curtis, Dr. Ray P. Dinsmore, and Dr. Walter Whitman. My final presentation will be made at the Honor Recipients' Luncheon, when Dr. William J. Sparks will receive his certificate. The INSTITUTE is honored by those whom it has honored.

Chapters

One of the achievements of the past two years lies in the strengthening of Chapter effectiveness through help and guidance from the National Council. Those who have contributed to this by their actual work in the Chapter deserve our hearty appreciation. During the past two years, I have visited all but two of the Chapters, those in Louisiana and Birming-

ham, Alabama. It is a source of deep regret that I could not include these Chapters. Discussion with the officers has shown that several Chapters are concerned by the small size of their meetings and by the large area from which they must draw. It has been stressed that even a small group gathered together at definite intervals to discuss national and local professional problems is doing real service to the INSTITUTE. The use of Chapter bulletins reaching people too distant to attend these meetings is a further help. My many visits have helped to carry from one Chapter to another the best ideas for operating. However, it has been determined better to formalize this as a Manual of Chapter Operations, and a committee, having membership from coast to coast, serving under the chairmanship of Dr. Maurice Kelley, has submitted a Manual for council criticism and action. It is an achievement for which we express our deep appreciation. While no new Chapters have been added there is definite activity which may lead to new ones in Milwaukee, St. Louis, Detroit, Houston, and San Francisco. The sectional organization of the Ohio Chapter has been cited as an example in the effective operation over a large area.

Employer-Employee Relations

Under the effective leadership of Dr. George Royer this committee has been of help in meeting one of our basic lines of service. A number of personal cases have been worked out with their advice. The problems of contracts has been a real one. I have seen several contracts which practically make it impossible for the research director to employ professional men; but at the same time the research director could not release the contract for formal crticism. Our approach is to stress contracts in this meeting so that those who are having problems along that line may have material to cite. The proposed contract is a very worthy document and should be most useful. In the national meetings your council has guided the society in a number of actions, most conspicuous of which was our handling of the Astin affair.

Education

The role of the INSTITUTE in stressing the chemist as an individual has a bearing upon education. Dean Neville, chairman of the committee, has made program plans for this meeting which indicate a worthwhile contribution to this idea.

Constitution

The committee under Benjamin Sweedler had given careful study to the problem of streamlining the Constitution without deviating from its basic intent. Certain things have needed clarification to go along with other changes which have occurred with time. The changes have been very thoroughly tested through National and Chapter Councils so that there now appears to be substantial unanimity for the adoption of the proposed Constitution.

Directory

While waiting for this Constitution to be revised, publication of a Directory has been withheld but a substantial part of the work of preparing the membership list and getting advertising has been done. I have been privileged to work with Mr. Robbins, our advertising representative, and would express great appreciation for the work which he has done, which is now resulting in good advertising for the Directory and greater and more representative advertising in THE CHEMIST.

Public Relations

One of the problems of the INSTITUTE is to let its light shine so that it may be seen by men, for thereby the INSTITUTE becomes strong through the support of others. The many aspects of this problem were put in the hands of a committee under Percy Landolt and it is expected that their suggestions will be useful.

General

In my review of the activities of the INSTITUTE, there are many others I could name for their effective service, but none more so than our secretary Lloyd Van Doren. The many details which devolve upon him have been effectively handled without my concern. To the members of Council and the Chapter groups with which I have worked, I give my deep appreciation in recognition of their cooperation and their service to the INSTITUTE. As I close my two years of service as President, I want to say that there has been a lot of hard work, but it has been a real joy thus to serve the profession. To our new president. Dr. Donald B. Keyes, I extend our best wishes, and will gladly help as he undertakes the work of this position.

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Will You Come

Sept. 8, 1954. Meeting of the AIC National Council and Board of Directors. The Chemist's Club, 52 E. 41st St., New York, N. Y. Dinner 6 p.m.

Sept. 16, 1954. AIC Luncheon during ACS meeting in New York, N. Y. Dr. E. J. Durham, Honorary Chairman; John Kotrady, chairman. Speaker Dr. Wayne E. Kuhn, "Professional Standards and Attitude."

May 12, 13, 14, 1955. AIC Annual Meeting. Chicago, Illinois. The Chicago Chapter has appointed Clifford A. Hampel to initiate arrangements.

May, 1956. AIC Annual Meeting. Tentatively scheduled for Washington, D.C.

Promoted: Dr. Ernest M. Weber, F.A.I.C., to director of biochemical research and development, of Chas. Pfizer & Co., Inc., Brooklyn, N. Y.

Opportunities

Doris Eager, M.A.I.C.

AIC members who are seeking positions may place notices in this column without charge.

Chemists Available

Research & Development Executive: Organic Ph.D. Registered professional engineer, F.A.I.C. Present head of chemical research and development section of internationally known firm seeks growth position in research coordination, direction or management. Box 60, THE CHEMIST.

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Chemist. Around $400 to start. Location New York City. Work in process development principally in the petroleum field. Box 61, THE CHEMIST.

Speaker: Richard L. Moore, F.A.I.C., director of personnel and assistant treasurer of Foster D. Snell, Inc., New York, spoke before the Draper Chemical Society of New York University, April 27th, on "Job Opportunities in Chemistry."

Honored: Dr. G. Frederick Smith, F.A.I.C., professor of chemistry at the University of Illinois and president of the G. Frederick Smith Chemical Company, Columbus, Ohio, who received the $1000 Fisher Award in Analytical Chemistry, from the American Chemical Society, in Kansas City, Mo., March 27th. He was cited for his "outstanding reputation as a professional analytical chemist, his unending enthusiasm, abounding energy and unusual insight." Prof. Smith, has, "over a lifetime of intense devotion to teaching, research and service, contributed to analytical chemistry as much as, or more than, any other living American."

Elected: Kurt G. Stern, F.A.I.C., of the Department of Chemistry, Polytechnic Institute of Brooklyn, as chairman of the newly established Chemists' Division of the United Jewish Appeal of Greater New York. Morris B. Jacobs, F.A.I.C., of the Department of Air Pollution Control, New York, N. Y., was elected secretary.

New Operating Divisions: Established by Pennsylvania Salt Manufacturing Co., Philadelphia 7, Pa., are: Industrial Chemicals and Chemical Specialties, to function as complete operating units for the manufacture and sale of their respective products.

Appointed: Dr. William H. Bowman, F.A.I.C., as vice president, Operations, of Jefferson Chemical Company, Inc., 260 Madison Ave., New York 16, N. Y. He is responsible for the current operations dealing with the manufacture and sale of the company's products.

Announced: By Howard Farkas, F.A.I.C., vice president and general sales manager of The U. S. Stoneware Co., Akron, Ohio, the appointment of R. E. Walther as Buffalo sales representative for the Chemical Ceramics Division, with headquarters at 220 Delaware Avenue Buffalo.

Speaker: Dr. Lincoln T. Work, retiring AIC president, before the Baltimore Section of the American Chemical Society, April 30th, on "Creation and Measurement of Fine Particles." The membership of the Baltimore Chapter of THE AMERICAN INSTITUTE OF CHEMISTS was invited to this meeting.

Announced: By President Charles Allen Thomas, Hon. AIC, of Monsanto Chemical Company, St. Louis, Mo., the appointment of Dr. I. B. Johns as senior scientist. This position was created to recognize outstanding technical accomplishments in Monsanto. The only other person holding the title is Dr. D. J. Beaver, F.A.I.C.

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Opened: A health consultation service to industry, P.O. Box 142, West Hartford 7, Conn., by Dr. Lawrence T. Fairhall, F.A.I.C., and Dr. Albert S. Gray. Dr. Fairhall was formerly scientist director of the U.S. Public Health Service.

Announced: By Dr. Louis Koenig, F.A.I.C., associate director of Southwest Research Institute, San Antonio, Texas, the appointment of George L. Cunningham to head a group of technologists working toward the advancement of inorganic chemistry and inorganic chemical manufacturing.

Appointed: By Brown - Allen Chemicals, Inc., Staten Island, N. Y., as its agent, M. B. Sweet, 9100 South Park Ave., Chicago. Products include paint vehicles, lithographic oils and specialties, caulking oils and foundry core compounds.

Appointed: C. W. MacMullen, F.A.I.C., as manager, Organic Chemical Research, of Olin Industries, Inc., New Haven, Conn.

Speaker: L. C. Cartwright, F.A.I.C., of Foster D. Snell, Inc., New York 11, N. Y., at the symposium on Food Acceptance Testing Methodology by the Advisory Board on Quartermaster Research and Development, in Chicago. His paper was on "Practical Applications of Trained Panel Methodology to Food Evaluation Problems."

Findings: Of a survey made by the American Society of Tool Engineers, Detroit 21, Michigan, indicate that industry considers 28 per cent of its present production equipment and manufacturing processes as obsolete or inadequate.

New Publication: By Southwest Research Institute, San Antonio, Texas, a monthly technical calendar for free distribution to 25,000 scientists and engineers in the region. Charles E. Balleisen is editor.

Announced: By Dr. Charles Allen Thomas, Hon.AIC, the appointment of Howard J. Heffernan as director of the Purchasing Department of Monsanto Chemical Company.

Moved: The Midwestern office of Arthur D. Little, Inc., to Board of Trade Building, Chicago 4, Illinois.

New Office: Opened in Phoenix, Arizona, by Stanford Research Institute of Stanford, California.

Honored: Carl Bussow, F.A.I.C., at the Annual Founder's Day Dinner of the Cooper Union Alumni Association, New York, N. Y., February 12, with a citation that reads: "Carl Bussow, Class of 1922: For outstanding professional achievements as consulting engineer and chemist in the field of bituminous materials: For selfless devotion to and continued efforts ever since student days on behalf of our Alma Mater and the Alumni Association: This citation is hereby awarded by the Alumni Association of The Cooper Union for the Advancement of Science and Art."

Japan: Is making long-range plans for the heavy production of petrochemicals, especially for the manufacture of plastics, synthetic fibers and detergents, Dr. Gustav Egloff, Hon.-AIC, stated recently, after his return from a tour of that country. "They already have established their first plant which is producing Saran, to make fish nets. This material will not rot, mildew, stretch or shrink, the basic hazards of the fish net industry."

The Impact: Of Science in the Fishing Industry, is the title of a series of papers in *Monthly Review* of the Federal Reserve Bank of Boston, by Daniel P. Norman, F.A.I.C., president of Skinner & Sherman, Inc., Boston, Mass. A bibliography is also available.

Honored: For fifty-years of membership in the American Chemical Society, during the society's national meeting in Kansas City, Mo., Prof. Perry A. Bond, F.A.I.C., retired from the State University of Iowa where he taught from 1918 until 1948, and Prof. Frederick E. Breithut, F.A.I.C., of San Diego, Calif., who headed the department of chemistry of Brooklyn College from 1930 until he retired in World War II. He was national president of THE AMERICAN INSTITUTE OF CHEMISTS from 1928 to 1932.

Appointed: J. Robert Bonnar, F.A.I.C., as sales manager, Dyestuff Division, General Dyestuff Corporation, New York 14, N.Y. He joined the company in 1935.

Elected: W. E. Santoro, F.A.I.C., as president of the New York Paint & Varnish Production Club.

Elected: As secretary-treasurer of the Society of Rheology, a founder society of the American Institute of Physics, William R. Willets, F.A.-I.C.

Announced: By R. E. Horsey, F.A.I.C., vice president in charge of sales of Givaudan-Delawanna, Inc., New York 36, N.Y., the appointment of James L. Stevenson to Givaudan's representatives in Detroit.

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—Sir Harold Hartley

Methionine deficiency, according to preliminary studies on monkeys by the Department of Nutrition of the Harvard School of Public Health, may be the forerunner of artherosclerosis.

The new cyanoethylation process for treating raw cotton with acrylonitrile, according to the Institute of Textile Technology, will result in a new family of textile fibers.

Streptomycin, an antibiotic, has the ability to penetrate plant tissue and then spread in an upward-onward course through the plant's circulatory system. Knowledge of this systemic action is of immediate value to growers preparing to use antibiotics in sprays for the control of bacterial diseases. It may eliminate the need for 100 per cent coverage of plant surfaces and thus save on labor and spray materials.

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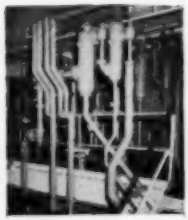

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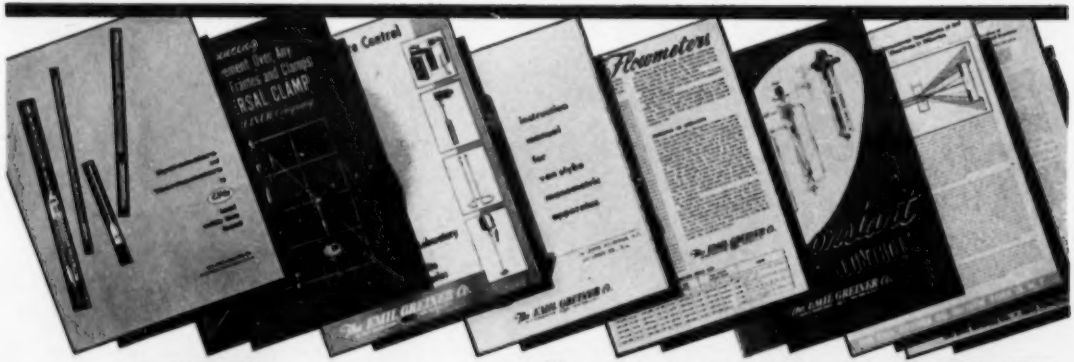

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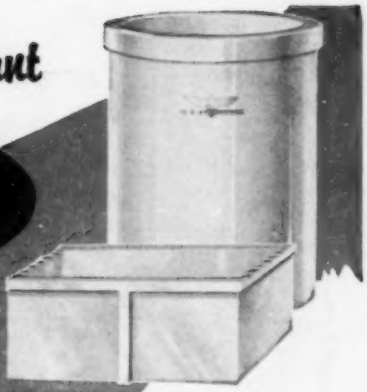

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